

# ***Darwin Initiative for the Survival of Species***

## ***Final Report***

### **1. Darwin Project Information**

Project Reference No.	13024
Project title	Inventory and Conservation of the Bryoflora of South Western Patagonia
Country	Chile
UK Contractor	Queen Mary University of London
Partner Organisation (s)	Universidad de Magallanes & Omora Foundation, Chile
Darwin Grant Value	£186,280
Start/End date	April 2004 – March 2007 (delayed release of funds resulted in project spanning September 2004 – September 2007)
Project website	<a href="http://www.cabodehornos.org">www.cabodehornos.org</a>
Author(s), date	Prof JG Duckett and Dr S Russell. January 2008.

### **2. Project Background/Rationale**

- Describe the location and circumstances of the project

This project took place in Tierra del Fuego, south and west of the Beagle Channel in Chile's Region XII ("Magallanes") including the Cape Horn archipelago. After the Year 2000, loosening of military control in the Fuegian Channel zone led to increasing exploitation of biodiversity and other natural resources, and adverse impacts on local habitats through farming and forestry including moss-collecting and peat-digging. Remnant native-American populations holding endangered ethno-botanical knowledge were also culturally endangered.

- What was the problem that the project aimed to address?

Bryophyte species far outnumber vascular plants in the Magellanic Province of southern Chile. Several hundred mosses had already been recorded for the Magellanian region, but many more species remained to be discovered, especially among the hepatics. The region is recognised as a "hotspot" for cryptogamic diversity in South America, but there was a dearth of local bryological expertise, scant protection for indigenous flora and severe threats to native vegetation. The region's National Parks (Cape Horn and Alberto d'Agostini) existed on paper only and had no permanent staff or infrastructure. The Darwin project aimed to address these issues through joint research activities, institutional strengthening, capacity-building and awareness-raising. Results were designed to feed into regional development planning for Chile's southernmost province and the national biodiversity action planning process.

- Who identified the need for this project and what evidence is there for a demand for this work and a commitment from the local partner?

Following the visit to the Beagle Channel region and the future Darwin Initiative project site by the President of Chile in 2001, UK personnel were invited to the region by Chilean government officials

and ecologists to advise on environmental problems and contribute to local training in biodiversity conservation. The collaborating institutions developed the Darwin Initiative project proposal during a visit by UK staff to southern Chile in December 2002-January 2003, funded by the British Embassy and the British Airways Assisting Conservation scheme. The Chilean partners committed to provide staff time and facilities, and to continue the work beyond Darwin funding. External specialists from Europe and the USA also offered their voluntary assistance with the proposed future project activities.

### 3. Project Summary

- What were the purpose and objectives (or outputs) of the project? Please include the project logical framework as an appendix if this formed part of the original project proposal/schedule and report against it. If the logframe has been changed in the meantime, please indicate against which version you are reporting and include it with your report.

**Project Purpose:** To better understand and conserve the threatened Magellanian “bryo-diversity hotspot” in southern Chile.

**Project Outputs** from original logical framework, unchanged during the project (appendix IV):

#### 1. Knowledge of Fuegian bryophyte diversity significantly improved

A quantum leap in knowledge of the Fuegian Bryoflora has been achieved by this Darwin project. New species and many dramatic range extensions have been recorded (e.g. *Grimmia orbicularis* new to Latin America; *Acaulon* and *Crossidium* new to Chile), and thousands of new records have been made at dozens of sites throughout Fuegia (see publications in Appendix III). This has moved the understanding of bryophyte distribution in the region beyond scattered records for a few regularly visited and easily accessed sites, to a more comprehensive overview of distribution in this global “bryo-diversity hotspot”.

#### 2. Enhanced understanding of relationships and functioning of Fuegian bryophyte vegetation

The improved knowledge of bryo-geography in Tierra del Fuego brought about by this project, has led not only to a better understanding of broader southern hemisphere and Gondwanalandic floristic relationships, but is also contributing to fundamental knowledge of early land plant evolution. Axenic culturing has produced new insights into the importance of protonemal features in moss systematics and exciting developments in the understanding liverwort-fungus symbioses (see Matcham *et al* - Appendix III). The functional importance of Fuegian bryophyte vegetation for ecosystem services in the region (e.g. hydrology, higher plant and animal habitats, education, tourism and culture) has also been highlighted in the training and outreach work undertaken during the project with government natural resource management agencies, the business and tourism sector, and community members including farmers, teachers and schoolchildren (Appendix V).

#### 3. Capacitation of local biologists for bryological survey, research and conservation

Scores of local biologists have been trained in bryological survey, research and conservation techniques by this Darwin project. The training has resulted in the development of a nucleus of field biologists, postgraduate researchers and technicians who are now specialising in bryological studies, in a region where there were none before (see Appendix II).

#### 4. Chilean conservation agencies and natural resource users influenced to protect bryophyte-rich habitat

Dozens of Chilean conservation agency staff have been exposed to the significance at local and global levels of the bryophyte-dominated sub-Antarctic tundra of southern Chile, during Darwin project training and outreach activities (seminars and conferences). This awareness-raising took place not only within the study area, but throughout Chile at other centres of learning and in the capital city of

Santiago, where senior government officials, policy-makers and media representatives were made aware

of the Darwin Initiative project outcomes. The project contributed significantly to the creation of a UNESCO Biosphere Reserve in the study area, which has greatly improved the level of protection afforded to bryophyte-rich habitats in southern Fuegia.

#### 5. Local capacity for *in vitro* culture of endangered cryptogam species established

South America's first specialist cryptogamic research laboratory with *in vitro* cultivation facilities has been established by the Darwin project at the Universidad de Magallanes in Punta Arenas, and permanent staff have been trained to operate the unit. The Darwin Initiative, over and above the original project commitment, has also provided the region's first cryptogamic herbarium facilities. This was brought about by leverage of additional external funding (from the British Bryological Society) and a generous donation of surplus equipment from the Chicago Field Museum (USA).

#### 6. Conservation of Fuegian vegetation and habitats enhanced

The base-line survey work and published outputs, capacitation of local biologists and conservation managers, provision of specialist study facilities and awareness-raising among natural resource-users, policy-makers, media representatives and school-children, have all contributed to a "step-change" in the way that the southern "tundra" lands are viewed by the Chilean people (according to feed-back from outreach events and media reports on this project – see Appendix III). This was further evinced by the high interest engendered at the time of creation of the UNESCO Cape Horn Biosphere Reserve (during the currency of the project, and to which DI activity contributed significantly). The creation of the Biosphere Reserve, coupled with raised environmental awareness among local politicians brought about in part by DI project activity, has effectively halted the march of resource extraction industries south through the Chilean archipelago, and has greatly lessened the threat to biodiversity and habitats in the region from, e.g. forestry, fish-farming, and extraction of minerals and Sphagnum peat. It has also led directly to more prudent tourism development along environmentally and socially responsible lines. This is the first Biosphere Reserve to be proclaimed in Chile for 20 years, the first to encompass marine areas, and the first to encompass territory not already included within official protected areas (National Parks). In Chile, this is seen as a major breakthrough for environmental planning and conservation action in a country whose economy has traditionally been based heavily on primary resource extraction.

- Were the original objectives or operational plan modified during the project period? If significant changes were made, for what reason, and when were they approved by the Darwin Secretariat?

The original objectives have been adhered to throughout the project, and all stated outputs have been achieved except for one (a national press release in the UK, but which was substituted by a local publicity release in the UK). However, due to the leverage of additional human and financial resources into the project, and due to the high profile that the project has enjoyed within the international bryological community and in wider Chilean society, many additional outputs were achieved beyond the original project commitments (see Appendix II). In order to accommodate these extra activities, changes (additions) were made to the operational schedule for the project, and were approved by the Darwin Secretariat at the times of annual reporting and yearly forward planning.

- Which of the Articles under the Convention on Biological Diversity (CBD) best describe the project? A Summary is presented in Appendix I.

The project directly addressed Chile's commitment to the CBD, through improving knowledge and protection of its bryophyte-rich southern lands and enhancing indigenous bryological capacity and conservation awareness. The project related to many of the CBD Articles, but mainly supported the Chilean Government's implementation of Articles 6 (general measures for conservation and sustainable use - 5%); 7 (identification and monitoring - 30%); 8 (in-situ conservation - 5%); 9 (ex-situ conservation

- 10%); 10 (sustainable use of components of biodiversity - 10%); 12 (research and training - 10%); 13 (publication and awareness - 10%); and 16 (access to and transfer of technology - 20%). Particular emphasis was given to Forest Biodiversity (30%), Mountain Biodiversity (40%), Protected Areas (15%) and Sustainable Use Themes (15%) (see Appendix I).

- Briefly discuss how successful the project was in terms of meeting its objectives. What objectives were not or only partly achieved, and have there been significant additional accomplishments?

The project was highly successful in meeting and in most cases exceeding its objectives. Examples include: UK staff time in-country (63 person weeks against 48 promised); publications (37 against 3 promised); press releases/publicity articles (7 against 3 promised); numbers of people trained (362 against 36 promised); numbers of person-weeks of training completed (141 against 72 promised); area conserved (specific site contribution - 4.8 million ha against 25 ha promised); research infrastructure facilities established (2 against 1 promised). The most significant extra accomplishments were the much larger number of publications accruing to the project; the co-funded extension of the training work to include many more trainees than planned; and the significant contribution that the DI project made to securing UNESCO Biosphere Reserve status for the whole Cape Horn region, instead of just the locally important Wulaia site. Lasting accomplishments of this project have been: 1) the creation of considerable awareness and concern for the bryophyte-rich habitats of southern Fuegia (“The Miniature Forests of Cape Horn”) where little or no interest or local expertise existed before; and 2) the contribution to protection and sustainable, non-consumptive use of natural resources - the new Cape Horn Biosphere Reserve and the “Tourism with a Hand-lens” ecotourism programme which is helping to support disadvantaged local communities in the area.

#### 4. Scientific, Training, and Technical Assessment

Please provide a full account of the project’s research, training, and/or technical work.

- **Research** - this should include details of staff, methodology, findings and the extent to which research findings have been subject to peer review.

Research activities under this Darwin project comprised: 1) base-line survey of bryophyte vegetation and collection of specimens from a full range of representative habitats in southern and western Tierra del Fuego; 2) taxonomic and bio-geographic assessment of the accrued plant collections; 3) laboratory studies of specimens for contributions to anatomical, taxonomic and evolutionary understanding.

Personnel involved in the project included four “core” staff part-funded by the Darwin Initiative (two British and two Chilean workers) and many collaborating researchers who gave their time free-of charge or in some cases with travel and subsistence paid (see list of contributors in Appendix IX).

The methodology for the research was to access the remote, sub-Antarctic study region by aircraft, marine vessels and four-wheel-drive vehicles during field expeditions. Standard field and herbarium techniques were applied to the collection, labelling, preservation and accession of specimens, which are being incorporated into permanent collections in Chile and overseas. Advanced techniques of specimen preparation, propagation, cryo-preservation and microscopy were used during laboratory studies (see publications listed in Appendix III).

The findings of the research have confirmed that southern Fuegia is a global hotspot for bryophyte diversity. Circa 5000 specimens have been collected from 40 localities throughout Fuegia, resulting in many new records for the region (analytical work on these collections is proceeding in Chile and at several other collaborating centres throughout the World (Appendix IX). Several putative new species have been discovered (e.g. in *Phaeoceros* and *Sphagnum*) and significant range extensions have been

demonstrated for many others (see listings in project Annual Report 2). This has moved the understanding of bryophyte distribution in the region beyond scattered records from a few regularly visited and easily accessed sites, to a much more comprehensive overview of geographical distribution in this global “bryo-diversity hotspot”.

37 publications produced by project personnel during the course of the DI project are listed in Appendix III, and cover a range of fields, viz: taxonomy, biogeography, plant evolution, conservation biology, protected area planning and environmental education. These include 6 ISBN-numbered books and 14 articles in peer-reviewed international journals.

- **Training and capacity building activities** – this should include information on selection criteria, content, assessment and accreditation.

The project originally undertook to train 36 Chilean biologists and natural resource managers in bryological and conservation techniques, for a total of 72 person-weeks of training. In the event, extra leveraged funding and the involvement of additional partners (e.g. EUROCHILE, SERNATUR, British Embassy, British Bryological Society etc) enabled a considerable amount of extra training activity to be undertaken by the project partners, resulting in 362 trainees benefitting from 141 person-weeks of training.

To accommodate the delayed release of funding at the start of the project and the practical necessities of the short working season during the southern summer at 56°S, re-scheduling of training activities took place at various stages in the project cycle. After project-start, the Chilean collaborators requested a longer period of practical, field based-training for local biologists during the early stages of the project, and shorter periods of intensive training for a much larger number of natural resource users and local people later-on in the project. This was made possible by considerable extra support for the DI training activities by several co-funding partners. Foremost among these was the organisation “EUROCHILE” (European/Chilean intergovernmental development organisation) which fortuitously began to support local environmental and tourism capacitation work shortly after the Darwin project got underway. The DI-Eurochile partnership enabled the training component of the Darwin project to extend in scope in terms of: 1) numbers of people trained; 2) subject areas covered (from pure bryology and conservation science to environmental education and sustainable development topics including ecotourism); and 3) geographic extent (training seminars, conferences and workshops were conducted not only in the study area of Tierra del Fuego, but also in several educational institutions, towns and cities further north in Chile, so as to emphasise the environmental and cultural importance of the “forgotten” Magellanic region more widely in Chilean society).

**Table 1. Approximate percentage distribution of sectoral affiliations for the 362 persons who received DI project training directly:**

Sector	%
<b>University staff members</b> e.g: Universidad de Magallanes, Punta Arenas; Universidad de Los Lagos, Osorno; Universidad de Chile, Santiago; Universidad Catolica de Chile, Santiago; Universidad Andres Bello, Vina del Mar.	5
<b>Postgraduate students</b> e.g: Universidad de Magallanes, Punta Arenas; Universidad de Los Lagos, Osorno; Universidad de Chile, Santiago; Universidad Catolica de Chile, Santiago; Universidad Andres Bello, Vina del Mar.	20

<b>Personnel of Governmental agencies</b> e.g: CONAF (Forestry and National Parks); CONAMA (Environment); CORFO (Regional Development); Dept of Agriculture; Police; Armada (Navy); SERNATUR (Tourism); SERPLAN (Planning); CONADI (Bureau of Indigenous Affairs); DIFRO (Boundary Commission); INACH (Antarctic Bureau); Regional and Provincial Governorates and Municipalities; UNESCO Man and the Biosphere Focal Point; Global Environment Facility Coordination Office	40
<b>Private business sector representatives</b> , e.g: COMAPA and CENTOMAR cruise-vessel tour guides, Ecocopter Ltd, Land-based tour guides, shop and hotel-owners and staff, media representatives (print and broadcast)	20
<b>Non-governmental organisations</b> e.g: EUROCHILE, EDUTEK, ENVIU, Puerto Williams Fishermen's Union, Ukika Indigenous People's Cooperative, Puerto Williams Local Producers Organisation, P/W Chamber of Commerce; PW Womens Association; P/W Accommodation Providers Group	10
<b>Local community members including school-children</b> e.g: Residents of Puerto Williams and Ukika, Isla Navarino	5

A more detailed list of names and affiliations of participants who received training during the DI project, is available from Dr S Russell (contact information in Appendix X).

Trainees were selected jointly by the Chilean and UK partners, based on the candidate's experience and qualifications, current role and expected post-course conservation impact of the trainee's work. Due to the publicity surrounding the Darwin project activity, there was considerable demand for the "free" training on offer, which extended beyond the local project area to several other centres in Chile. Bryology and conservation courses were therefore arranged through collaboration with partners at five other academic centres outside the study area, in order to satisfy this demand (see Appendix V).

Training course content was based on the purpose and objectives of the Darwin Initiative project (capacitation in bryology and conservation of Chile's southern lands). Technical training involved both field- and laboratory-based work in the study area, and as a result of this, a nucleus of bryologically trained personnel are now working in Chile where there were none before. Some of the training was also broadened-out upon request, to include the project-relevant subject of "ecotourism" as a means of applying biodiversity and ecological knowledge to support livelihoods in the fast-growing tourist economy of Chile's far south. Key to this has been the project's unique development of the rich lower plant resources of Fuegia as a tourist attraction, through the concepts of "The Miniature Forests of Cape Horn", "Tourism With a Hand-lens" and the establishment of a moss garden and tourist trail in the Omora Foundation's Ethno-botanical Park at Puerto Williams. This latter facility now attracts a constant flow of visitors including overland travellers and passing cruise vessel passengers, and is helping to sustain livelihoods within the local Yaghan (native American) population (personal communication from the Governor of the Cape Horn Province).

Where DI training formed part of a formal degree module for Chilean postgraduate students, trainees were assessed using the normal University evaluation procedures. In all other cases of DI short-course training, participants were de-briefed through end-of course feedback questionnaires and were awarded Course Completion Certificates and informal prizes for achievement (see Appendix XII).

## 5. Project Impacts

- What evidence is there that project achievements have led to the accomplishment of the project purpose? Has achievement of objectives/outputs resulted in other, unexpected impacts?

As detailed above in Section 3, the promised project outputs were all met and exceeded except for one (national press release in the UK). This has clearly led to the achievement of the project purpose, viz: “To better understand and conserve the threatened Magellanian “bryo-diversity hotspot” in southern Chile”. Evidence for this subsists in: 1) the substantial increase in numbers of publications on Fuegian “Bryo-diversity” that has ensued (Appendix III); 2) the high-level of uptake of project-related technical manuals, field-guides and environmental education books produced by the project team members (Appendix III); 3) the wide coverage of project activities and outcomes by local, regional and national media in Chile (Appendix III); 4) the universally positive feedback concerning project impacts from government officials and politicians locally and nationally, including many who did not undertake Darwin Initiative training activity; 5) the DI project’s significant contribution to the creation of the UNESCO “Cape Horn Biosphere Reserve”; and 6) the way in which Darwin project team-members were welcomed into the local communities of southern Fuegia. This includes the academic community of staff and students at the Universidad de Magallanes in Punta Arenas; UK personnel have continued their links with the institution through visiting lectureships and an Honorary Professorship at the University (see Appendix XII). It also includes the community of inhabitants of the southernmost town on Earth - Puerto Williams – where Darwin project personnel were welcomed with great warmth and generosity. According to feedback from local government officials, business-people, teachers and schoolchildren, the team was particularly appreciated for their visits and community-participation activities during all seasons of the year, and not only in the summer “tourist” period.

An unexpected aspect of this project has been the much greater scale at which it has been possible to achieve impact, compared with the modest expectations of the original project proposal. All outputs were exceeded except for one (UK press release), and the injection of additional, leveraged, partnership-funding allowed for a much greater number of people to be trained, a broader spread of publication outputs to be disseminated, and a vastly greater area of land to be secured for conservation protection than originally estimated.

- To what extent has the project achieved its purpose, i.e. how has it helped the host country to meet its obligations under the Biodiversity Convention (CBD), or what indication is there that it is likely to do so in the future? Information should be provided on plans, actions or policies by the host institution and government resulting directly from the project that building on new skills and research findings.

As detailed in Section 3 (above) and in Appendix I, this project contributed to many of Chile’s commitments to the CBD. The project contributed specifically to the local and regional planning process and to key documents (e.g. Cape Horn Province Regional Development Plan). It also fed into national policy in two fields: tourism, through the eco-tourism workshop in the capital city – Santiago – which was attended by high level ministry and departmental officials; and conservation planning, through the training and publication outputs which included the final Chapter (contributed by Dr Rozzi) in the benchmark official publication: “The Biodiversity of Chile”, published by the National Environmental Agency (CONAMA) in 2006. The creation of the Cape Horn Biosphere Reserve has also been seen by many in Chile as a watershed for environmental conservation and the willingness of the Chilean Government and local communities to embrace environment and biodiversity priorities. This is further evinced by the inclusion within the Reserve of productive and previously un-protected marine resource areas, and the zoning of the region for both tourism and strict protection.

- Please complete the table in Appendix I to show the contribution made by different

components of the project to the defined in the CBD Articles.

measures for biodiversity conservation

The project related to many of the CBD Articles, but mainly supported the Chilean Government's implementation of Articles 6 (general measures for conservation and sustainable use - 5%); 7 (identification and monitoring - 30%); 8 (*in-situ* conservation - 5%); 9 (*ex-situ* conservation - 10%); 10 (sustainable use of components of biodiversity - 10%); 12 (research and training - 10%); 13 (publication and awareness - 10%); and 16 (access to and transfer of technology - 20%). Particular emphasis was given to Forest Biodiversity (30%), Mountain Biodiversity (40%), Protected Areas (15%) and Sustainable Use Themes (15%) (see Appendix I).

- If there were training or capacity building elements to the project, to what extent has this improved local capacity to further biodiversity work in the host country and what is the evidence for this? Where possible, please provide information on what each student / trainee is now doing (or what they expect to be doing in the longer term).

The project training activities are summarised under Training and Capacity-Building Activities in Section 4 (above) and in Appendix V. These events included training in general bryology, cryptogamic laboratory techniques, conservation awareness and ecotourism. Several hundred persons received training ranging from one day to several weeks in these disciplines, and this has created an awareness of the importance of “lower plants” not only locally in the study area, but nationally as a result of the “touring workshop” format of the training throughout Chile in Year's 2 and 3 of the project. It has resulted in scores of general biologists and conservation officials receiving specific bryology training, and it has created a nucleus of specialist postgraduate scientists and technicians who are now working on bryological studies, where hitherto there was no local capacity in this discipline. This raised awareness was reflected in the wide media coverage of the project outputs and the excellent uptake of published materials arising from the project (Appendix III). It is not possible in this space to report on the individual outcomes for the 362 trainees who benefitted directly from the Darwin Initiative training activities. However, examples include:

- Academic and research staff at four Universities in Chile are now including bryophytes in their field and laboratory teaching and research work.
- Technical and herbarium staff at Colleges and Universities in Chile are now including bryophytes for study in their laboratories and collections.
- Postgraduate students have “discovered” bryophytes and are now pursuing bryological studies for further research degrees.
- Schoolteachers and their pupils in Puerto Williams, Punta Arenas and Santiago are including bryophytes in their nature study curriculum for the first time, including ongoing use of the environmental education materials produced by this project.
- Cruise-vessel and land-based tourism guides (including the “out-of-season” fishing community) were particularly appreciative of the opportunity to gain greater insights into the bryophyte-dominated vegetation of the southern “tundra” zone of Chile, and are now passing this knowledge on to visiting tourists, with benefits for the local economy.
- Local residents, including native Americans, teachers and schoolchildren, have been provided with greater knowledge about their local environment, its need for conservation and the potential for non-consumptive use in support of sustainable rural livelihoods.
- Local officials (including Heads) of natural resource management agencies have secured a deeper understanding of the composition and functioning of their local vegetation and habitats, and have been highly appreciative of the DI-supported training activity and guide books.
- Government officials and politicians from regional to national level were sensitised to the



biodiversity importance of the Fuegian region and the “Miniature Forests of Cape Horn”, and then assisted in the process of having the area declared a UNESCO Biosphere Reserve.

Individual testimonials, including formal training feedback and informal personal communications can be provided as necessary in support of the above assertions. The images in Appendix XII give a flavour of the wide range of research, training and awareness-raising outputs achieved by the project.

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

The project set-out to build-on a collaboration between a handful of staff at two UK universities (Queen Mary and Bangor) and the Universidad de Magallanes and Omora Foundation (conservation NGO) in southern Chile. The partnership between the individuals was highly successful and productive, and has resulted in the individuals concerned continuing with joint work and exchange activities. More than this however, the high profile of the project resulted in its attracting a much larger group of collaborators among academic and technical staff and students at three other major universities in Chile, in addition to the Universidad de Magallanes, viz: the Los Lagos University in Osorno, Andres Bello University in Vina del Mar, and the University of Santiago in the capital city. Furthermore, the interest engendered by the project among the international cryptogamic science community, attracted the involvement of (and additional funding from) researchers in Canada, Denmark, Germany, Korea, Finland, Spain and the United States, who have in turn greatly boosted the research and publishing outputs of the project. In addition, many other local organisations were drawn into the project and assisted with training and publication work. Examples include CORFO, CONAMA, CONAF, SERNATUR, EUROCHILE, EDUTEK etc, and several local community and business groups (acronyms explained in Table 1).

Members of the project team not only provided a forum for the airing of local environmental issues during formal training events, but they also took part in (and in some cases were lead facilitators of) meetings called by local government officials up to Provincial Governor (“Gobernador/a”) and Regional Superintendent (“Intendente/a”) level. This often helped to bring together traditional adversaries in natural resource-based conflicts and was particularly important for raising awareness of the potential for an ecotourism-based economy in southern Fuegia. It was also crucial during negotiations with the forestry, fishing and commercial tourism communities during planning for the UNESCO Cape Horn Biosphere Reserve. The Governor of the Cape Horn administrative area has frequently applauded the role of the Darwin Initiative team, both for its contribution of an “evidence base” for policy, planning and community awareness-raising in southern Fuegia, and as an “honest broker” and provider of “neutral space” during sensitive negotiations between local factions as planning for the Cape Horn region has progressed. These meetings included presentations by DI project personnel for e.g., the political head (“Intendenta”) of Chile’s Magellanian Region XII, the National and Regional Heads of the Forestry and National Parks Agency (CONAF), owners of the principal airline, cruise ship and hotel businesses in the country etc.

The Governor of the Cape Horn Province also commended team members on having set a crucial precedent and “made history” by securing permission for cross-border field studies between Chile and Argentina during the DI project. This was seen as indicative of the thawing of political relations between two countries that had nearly gone to war over boundary conflicts in the Beagle Channel zone. It was also seen as symbolic of the loosening of military control over the Fuegian Channel region in the post-Pinochet era, and a sign of the empowerment of local communities who now exercise more control over natural resources through their democratically-elected political representatives.

- In terms of social impact, who has benefited from the project? Has the project had (or is likely to result in) an unexpected positive or negative impact on individuals or local communities? What are the indicators for this and how were they measured?

The project did not set-out directly to improve livelihoods, and no social-benefit outputs were included in the logframe. However, it was originally intended that local tour guides would be included as beneficiaries of Darwin Initiative training activity, and that skills-transfer to representatives of indigenous native-American groups would assist in the sustainability of their threatened livelihoods. This proved to be particularly opportune, as employment opportunities at the naval base in Puerto Williams contracted following partial closure of the military facility during the currency of the DI project. This, in turn, coincided with the opening-up of the Fuegian Channel Zone to greater tourist access with the concomitant need for more tourism support services (transport, guiding, accommodation, food, souvenirs/curios etc). A wide range of local people including members of the indigenous native American community (descendants of the “Yaghan” Indian population at Ukika commune in Puerto Williams) took part in the training. Several of these have started their own ecotourism, guiding and accommodation businesses, including an “In the Footsteps of Darwin” tour which follows the track of HMS Beagle through southern Fuegia. The Darwin project training schedule was altered to accommodate the need for this “eco-guide” training during the winter months, outside of the summer tourist season. The training was also greatly appreciated by company tour guides aboard cruise vessels that ply the Fuegian Channels, as evinced by the many testimonials and requests for further training that the project team received from ship-borne guides and tour company executives.

Although the project did not directly measure the socio-economic impact of its conservation and tourism training for the local community, it is evident that positive impact has paralleled the rapidly increasing numbers of tourists who are now passing south across the Beagle Channel. There has been a rapid improvement in quantity and quality of accommodation and local “nature” tour opportunities available in Puerto Williams during the lifetime of the project; there are many more tourists paying for guided tours to the project-generated moss-garden and nature trail in the ethnobotanical park near the town; and there has been new job creation through the employment of (Darwin-trained) local people as nature tour guides by managers of new hotels and lodges that are opening in the region. Project team members have received many personal testimonials from employee-guides and employer-managers as to the importance of the DI training in this regard.

Another positive social impact that was difficult to measure but was reported to the team by indigenous people in the study area, was the opportunity for them to take part in and logistically support the expeditions and training field trips conducted by the Darwin project. Team members came better to understand the cultural and historical linkages between local communities and their environment as a result of this interaction. Another spin-off was assistance given to indigenous groups with survey work of traditional sites, and written representations to the authorities in respect of tourism concessions and native land claims.

## 6. Project Outputs

- Quantify all project outputs in the table in Appendix II using the coding and format of the Darwin Initiative Standard Output Measures.

Project outputs are tabulated and coded in Appendix II against the DI standard output measures.

- Explain differences in actual outputs against those in the agreed schedule, i.e. what outputs were not achieved or only partly achieved? Were additional outputs achieved? Give details in the table in Appendix II.

All but one of the agreed project outputs were achieved and in many cases exceeded. The promised national press release in the UK was substituted by a local publicity article. Outputs were promised

under 9 formally coded categories (6A, 6B, 8, 9, 10, 11B, 15A, 15C and 21). However, many more outputs were achieved than originally proposed, under 18 further project codes (4C, 4D, 7, 11A, 13A, 14A, 14B, 15B, 15D, 16A, 16B, 17B, 18A, 18C, 19A, 19C, 20, 23). A summary is given in Appendix II.

- Provide full details in Appendix III of all publications and material that can be publicly accessed, e.g. title, name of publisher, contact details, cost. Details will be recorded on the Darwin Monitoring Website database.

A list of publications accruing to this project so far, is given in Appendix III. Copies of publications are available from the Project Manager: Dr S Russell (contact details in Appendix X). Journal article reprints are free-of-charge; books (published in Chile) are individually-priced on application due to differing exchange rates and postal charges.

- How has information relating to project outputs and outcomes been disseminated, and who was/is the target audience? Will this continue or develop after project completion and, if so, who will be responsible and bear the cost of further information dissemination?

Information relating to project outcomes has been disseminated through the much larger published output than was originally expected (37 instead of 3 publications). Project updates have been circulated in the annual newsletters on the Omora Foundation website, in publicity articles such as the Queen Mary University Bulletin, through broadcast (radio and TV) items in the host country (a sample video pice accompanies this submission) and in the many press articles which appeared around the time of the declaration of the UNESCO Cape Horn Biosphere Reserve. In addition, project team members have given expositions of project work at several scientific meetings (e.g. the British Bryological Society AGM, British Antarctic Society Conference, Darwin Initiative Annual Meeting and Exhibition (poster), the International Association of Bryologists Congress, American Bryological and Lichenological Society Symposium and Millennium Institute for Ecology and Biodiversity (Santiago) Conferences in 2006 and 2007. Target audiences have included academic researchers, Chilean policy-makers and natural resource managers, and the general public. This dissemination process is continuing in Chile and the UK, and is being supported by the project partners' own resources.

## 7. Project Expenditure

- Tabulate grant expenditure using the categories in the original application/schedule.

**Table 2. Project Budget and Annual Expenditure**

	Total Budget	Year 1 Expenditure	Year 2 Expenditure	Year 3 Expenditure	Total Expenditure
Staff Costs					
Rent, rates, heating, lighting, cleaning					
Postage, telephone, stationery					
Travel and subsistence					
Printing					
Conference, seminars etc					
Capital items					
Other					
<b>Total</b>					

Some minor re-scheduling of project activities (expeditions and training events) took place as agreed by the DI Secretariat, but it was not necessary to change the DI budget for these activities.

- Explain any variation in expenditure where this is +/- 10% of the budget.

An administrative oversight on the part of the project team led to a portion of the Darwin grant being unclaimed during the early project cycle. However, the resulting shortfall in project funding was compensated-for by additional external leveraged funding that allowed the project to be completed on time, and to exceed most of its targets.

## 8. Project Operation and Partnerships

- How many local partners worked on project activities and how does this differ from initial plans for partnerships? Who were the main partners and the most active partners, and what is their role in biodiversity issues? How were partners involved in project planning and implementation? Were plans modified significantly in response to local consultation?

The project set-out to build-on a collaboration between a handful of staff at two UK universities (Queen Mary and Bangor) and the Universidad de Magallanes and Omora Foundation (conservation NGO) in southern Chile. Nine collaborating individuals were listed in the original project application. However, the high profile of the project resulted in its attracting a larger group of local and international collaborators who took part in the research expeditions and/or contributed to DI training activities - 30 individuals, including scientists from Canada, Denmark, Germany, Korea, Finland, Spain and the United States (listed in Appendix IX). In addition, approximately 120 local academic and technical staff and students were involved in the training events throughout Chile, with the Omora Foundation in Puerto Williams, at the Universidad de Magallanes in Punta Arenas, the Senda Darwin Foundation in Chiloe, Los Lagos University in Osorno, Andres Bello University in Vina del Mar, and at the University of Santiago in the Chilean capital. Additional individuals from Chilean state organisations and NGOs assisted with the training, e.g. CORFO, CONAMA, CONAF, SERNATUR, EUROCHILE and EDUTEK.

The principal and most active project partners were the staff of the Omora Foundation in Puerto Williams, and the Universidad de Magallanes in Punta Arenas. Both of these organisations contribute substantially to biodiversity conservation and planning in southern Fuegia, and two DI project staff based in these institutions (Drs Rozzi and Massardo) were the lead authors of the published outputs that proposed and nominated the UNESCO Biosphere Reserve during the currency of the DI

project. These same local personnel were the ones who collaborated with the UK team members to prepare the original DI project proposal. They were also the key contacts who flagged-up issues such as the increased demand for training, the seasonal scheduling requirements for different training audiences, the need for field as well as laboratory-based training, the requirement for herbarium facilities as well as a cryptogamic laboratory etc. The project scheduling was adapted to accommodate these locally identified needs, without affecting the overall project purpose but greatly increasing the depth and reach of the project in terms of its outputs.

- During the project lifetime, what collaboration existed with similar projects (Darwin or other) elsewhere in the host country? Was there consultation with the host country Biodiversity Strategy (BS) Office?

Early consultation had taken place with members of the former DI project (Raleigh International) at Laguna San Rafael. Considerable interaction took place with the DI-supported Senda Darwin Foundation at Chiloe, including joint training of personnel and reciprocal site research visits.

Collaboration also took place between the two groups for publication of journal articles. Several additional conservation biology collaborations have ensued as a result of the DI project training events at the partner institutions further north in Chile (e.g. the annual coastal bryophyte and lichen field excursions for students at Andres Bello University in Vina del Mar).

- How many international partners participated in project activities? Provide names of main international partners.

20 international partners contributed directly, from Canada, Denmark, Germany, Korea, Finland, Spain and the United States (names listed in Appendix IX).

- To your knowledge, have the local partnerships been active after the end of the Darwin Project and what is the level of their participation with the local biodiversity strategy process and other local Government activities? Is more community participation needed and is there a role for the private sector?

The local partnerships that were nurtured and consolidated during the DI project, have grown and flourished since project-end. The groupings that helped create the UNESCO Cape Horn Biosphere Reserve are now engaged in practical management planning for the whole of the southern Fuegia region; the private sector (particularly tourism and fisheries interests) have engaged fully in the planning and development of ecotourism facilities as a result of the rapid increase in visitors to the region; previously disadvantaged local and indigenous communities have significantly expanded their involvement in the new “green tourism” economy; and local officials up to the highest political level (Provincial Governor and Regional Superintendent) have embraced the environmental imperative as a basis for further conservation and development in the Cape Horn region (see images in Appendix XII).

## 9. Monitoring and Evaluation, Lesson learning

- Please explain your strategy for monitoring and evaluation (M&E) and give an outline of results. How does this **demonstrate** the value of the project? E.g. what baseline information was collected (e.g. scientific, social, economic), milestones in the project design, and indicators to identify your achievements (at purpose and goal level).

This project was intended to be principally a scientific evidence-gathering exercise with spin-offs for conservation awareness and planning in southernmost Chile. As such, the agreed monitoring and evaluation strategy, including milestones and indicators, dealt mainly with publication and dissemination outputs and quantitative training impact. No collection of base-line social or economic information was planned or executed. The scientific outputs as measured by publications, and the training outputs as measured by numbers of trainees and duration of training, were considerably exceeded. However, the timing of the project coincided with a new and unfolding political dispensation in southern Chile, and with the opening-up of the area to rapidly increasing tourist arrivals. During its course therefore, the project adapted to the local demand for broader training aimed at livelihood outcomes (ecotourism development) and a national need for increased awareness of the conservation value of Chile's southern lands. While monitoring and evaluation of the originally-agreed project outputs was therefore straightforward, the wider social and economic impacts of the additional work that the project undertook, is more difficult to quantify. The value of this work is best appreciated through the magnitude of additional and exceeded outputs, e.g. 27 instead of 9 coded outputs, 63 person weeks of UK staff time in-country against 48 promised; 37 publications against 3 promised; 7 press releases/publicity articles against 3 promised; 362 people trained against 36 promised; 141 person-weeks of training completed against 72 promised; two research facilities against one promised; and contribution to the creation of a 4.8 million ha UNESCO Biosphere Reserve against a 25ha World Heritage Site planned. The creation of the Cape Horn Biosphere Reserve stands as a practical testimony to the work carried out by DI team members, and a lasting legacy for the contribution made by Darwin

Initiative funding (project salaries for the lead proponents of the Reserve, funding of publication of the official proposal and nomination documents, and support for field work for the Reserve's natural resource evidence-base). Media coverage and feedback from local stakeholders concerning the DI project has been universally positive, and it is clear to see in Puerto Williams for example, how DI training has led to enhanced conservation awareness and improved local capacity for ecotourism development as the region has opened-up to increased visitor numbers during the lifetime of the project.

- What were the main problems and what steps were taken to overcome them?

The main problems during this project centred on the needs to: 1) accommodate the increased demand for training; 2) adapt the schedule to training needs at different times of the year; 3) incorporate broader habitat coverage in the field work (wet season Patagonian steppe as well as sub-Antarctic forests and tundra); 4) provide herbarium as well as laboratory facilities for local cryptogamic science capacity. All these problems were overcome by fast-response re-scheduling of project activity, attraction of additional partners into the project, and leverage of substantial extra funding to extend the scope of the project in depth and reach. An unfortunate oversight in project administration (a missed DI claim) resulted in a shortfall in Darwin funding coming into the project, but this too was overcome by securing additional leveraged external funding and voluntary contributions of time-input by project staff.

- During the project period, has there been an internal or external evaluation of the work or are there any plans for this?

Internal project review has been undertaken by the team members during project planning and management meetings. Apart from the Referee's Reports on the Years One and Two project Annual Reports, there has not been an independent external assessment of the project. The team would welcome a desk and/or visit-based study in the UK and/or Chile. Team members have cooperated with and scored highly in previous Darwin Initiative host country evaluation visits, and are ready to provide local assistance and help in accessing independent arbiters of project impacts as required.

- What are the key lessons to be drawn from the experience of this project? We would welcome your comments on any broader lessons for Darwin Initiative as a programme or practical lessons that could be valuable to other projects, as we would like to present this information on a website page.

Team members agree that key elements which contributed to the project's success, were: 1) good pre-project planning involving in-country site visits and problem identification before the project started; 2) the privilege for the UK team of collaborating with some of Chile's hardest-working, most committed and highly-respected environmentalists on this project; 3) through networking and profile-raising, the attraction of many additional project collaborators and co-funders to enhance the depth and reach of the project; 4) the willingness of team members to stretch the budget to the limit, and endure extreme field conditions during research work in the sub-Antarctic zone; 5) the ability of the team members (and the Darwin Secretariat) to be adaptable and responsive to changing needs as the project progressed, allowing us to increase and extend the planned work with considerably improved impact and effectiveness. There was also an element of fortuitousness in this particular project, as it coincided with a period of political and social "re-birth" in Chile, and a new willingness to embrace environmental ideas within the country.

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

- Have you responded to issues raised in the reviews of your annual reports and discussed the reviews with your collaborators? Briefly summarise what actions have been taken during the project as a result of recommendations from previous reviews (if applicable).

This project was reviewed in Years 1 and 2 and was described by the Reviewer as: "stimulating", "innovative", "exciting" and "impressive". The Reviewer stated that the project had: "exceeded its targets" and "generated extensive international collaboration". The project team were: "highly commended" for "the degree of co-operation established with the Chilean authorities and the high level of international scientific collaboration". It was stated that: "In addition to the scientific and conservation legacy within the host country, the collections from this remote and relatively unknown region will provide a global resource for future research". The team's contribution to the successful bid for UNESCO "Biosphere Reserve" status for the Cape Horn region was also "highly commended". Furthermore it was: "especially valuable to learn that the project participants have been able to make a contribution to the welfare of the indigenous peoples of the area".

Issues raised by the Reviewer for attention, and responses are as follows:

*1) What protocols are in place to ensure that collection materials are identified and named specimens are lodged with the Chilean herbaria once DI funding has ended?*

The project team and its other Chilean and international collaborators undertook to and are continuing with the identification and analysis of specimens collected during the DI project, and the publishing of these results (see Appendix III). Core sets of specimens have been lodged in the Herbarium facility at UMAG (cabinets provided by the Chicago Field Museum as a result of DI leverage) and in the Field

Station at Puerto Williams. Permanent local staff have been trained by the DI project to curate and maintain these collections and further sets of specimens have been promised by the international collaborators to be sent in a phased manner, so as not to overwhelm local capacity as the curation capability “beds in”.

Several overseas team members have been able to continue their visits to southern Chile for joint-working on the collections after the cessation of Darwin funding, and are pursuing further project grants to allow this process to continue.

*2) Long term curation of the specimens collected during the expeditions.*

As above, herbarium storage facilities have been provided and staff trained to curate and manage the collections made during the Darwin project.

*3) How many sets of duplicates will be produced and where will they be lodged?*

The cryptogamic herbarium collections at UMAG and the Field Station in Puerto Williams have been founded on one core set of specimens provided by UK team members Prof Jeff Duckett, Dr Sylvia Pressel, Dr S Russell and Howard Matcham, plus the personal collections of the Chilean collaborators and trainees. However, three additional sets of named and critically assessed specimens are due to be donated to the UMAG facility by the project’s international collaborators in the USA and Europe, in a phased manner for the reasons stated above.

*4) How many sets of duplicates will be held within Chile, and will any of the material be made available to Argentina?*

Due to the multiple sets of duplicates that have been assembled by the project collaborators, it is expected that the UMAG facility will be able to exchange specimens with institutions elsewhere in Chile (e.g. Prof Mary Kalin at IEB Santiago and Juan Larain Benoit at Universidad de Concepción) and more widely on the South American continent. One batch of specimens has already been passed to Argentina as a result of the training of an Argentinian specialist (Damian Fernandez) in bryological techniques on

the Masters Course in “Management and Conservation of Sub-Antarctic Natural Resources” at UMAG.

*5) Will a reference collection be retained in the field laboratory in Puerto Williams and facilities provided for its safe storage in the prevailing climate?*

A reference collection of bryophytes and lichens has been retained in temporary storage at the field laboratory in Puerto Williams. This is maintained in a continuously heated house used by UMAG staff and students in the town, and herbarium cabinets are due to be moved there for permanent storage of specimens in 2008.

*6) Is there sufficient flexibility in the project timetable to allow personnel to handle the extra specimens collected during the field expeditions?*

The large numbers of specimens collected by the expedition teams which were boosted by international collaborators, are still being identified and taxonomically assessed in many institutions around the world. The co-workers are contributing to a continuing flow of publications resulting from the project activities, and additional duplicate specimen sets are due to be returned to Chile to add to the core reference collections that have already been established at UMAG and Puerto Williams.

*7) How will the role of the in vitro cultivation facility develop after the end of the project?*



The in vitro laboratory has now been in place for nearly three years, and continues to be a key cryptogamic research and training facility for UMAG. It is fully supported by the university, with permanent and now bryologically-trained staff. Several research papers have already emanated from the facility as a result of the three seasons of joint studies undertaken by Prof Duckett and Dr Silvia Pressel with Chilean collaborators at this laboratory. The work is expected to continue and expand as more local and visiting scientists take advantage of the facility.

*8) Is the level of scientific inter-continental collaboration sufficient to allow other countries in South America to benefit from the equipment and expertise based in Chile?*

The new herbarium and analytical laboratory at UMAG and the Field Station at Puerto Williams are open, functioning and available for the use of researchers from around the World, including South America. They have already hosted several visiting bryologists from Europe, Asia and North America, and have provided bryological study material and advanced training for postgraduate students from Argentina, Brazil, Colombia and Venezuela, through the bryology sessions on the MSc in “Management and Conservation of Sub-Antarctic Natural Resources” at UMAG.

Research links with South America have tended to be outward, mainly between widely-separated individuals on the continent and their collaborators overseas (particularly in Europe and the USA). This Darwin project did its best to reach out to biologists elsewhere in Chile, and went beyond its brief during its training work to include more than 100 staff and students at other Chilean institutions. The linking of the widely-dispersed and as yet tiny community of bryological researchers in South America in joint research and publishing activity, is a process that is likely to grow organically over future years, and is being pursued informally through the activities of indigenous groupings such as the Latin American Bryological Society, and overseas organisations such as the Bryological Societies of Spain and South Eastern Europe, the British Bryological Society, the International Association of Bryologists and the American Bryological and Lichenological Society.

Now that a southern South America collection is housed at UMAG, it is intended that specimen exchanges will take place with the Hassel de Menendez and Matteri collections in Argentina, and through links with the Latin American Bryological Society which has members in Argentina, Bolivia, Brazil, Colombia, Peru, and Venezuela.

## **11. Darwin Identity**

- What effort has the project made to publicise the Darwin Initiative, e.g. where did the project use the Darwin Initiative logo, promote Darwin funding opportunities or projects? Was there evidence that Darwin Fellows or Darwin Scholars/Students used these titles?

The project publicised the Darwin Initiative during all its activities, including training courses, research seminars and conferences, and local environmental education events including field trips. DI was acknowledged in all the academic and popular published work, with the Darwin logo being printed on title pages and end-papers (see Appendix IX, images).

- What is the understanding of Darwin Identity in the host country? Who, within the host country, is likely to be familiar with the Darwin Initiative and what evidence is there to show that people are aware of this project and the aims of the Darwin Initiative?

Chile has been particularly well-served by the Darwin Initiative in recent years, with several DI projects continuing in-country at present. Due partly to the involvement of the national conservation agency (CONAF) in these and earlier projects, and also the support of the British Embassy in Santiago, there is a good awareness of the Darwin Initiative in Chile. Our team feels that we have made a major contribution to this, by extending our training activities throughout the country, and by securing a high level of media coverage for our work (see Appendices III & V). The inclusion of university staff and

students, NGO workers, business-people, local residents and representatives of a wide range of government departments in our training, has extended knowledge of the Darwin Initiative across the widest possible stakeholder base (see Section 4, Table 1).

- Considering the project in the context of biodiversity conservation in the host country, did it form part of a larger programme or was it recognised as a distinct project with a clear identity?

This Darwin Initiative project retained its distinctive identity throughout, partly due to the specialist nature of its focus organisms (bryophytes), but also due to the iconic status of the study area (Tierra del Fuego and Cape Horn). According to feedback from stakeholders in Chile, the project was seen to be associated with the “opening-up” of the southern regions of Chile to greater access and development, and the growing importance of environmental issues in planning for the country. The concepts of the “Miniature Forests of Cape Horn” and “Tourism with a Handlens” have stimulated considerable interest, and led to new tourism opportunities, ongoing environmental education initiatives and several popular publications, all with Darwin Initiative associations.

Because of this profile, the project was able to attract considerable extra funding and partnership collaborations with several other organisations and agencies. There were times, therefore, when headlining and logos were shared, for example with EUROCHILE in some of the training activities and at the Santiago ecotourism Seminar. However, the Darwin identity was emphasised at all times, and was recognised by the media and in all published outputs.

## 12. Leverage

- During the lifetime of the project, what additional funds were attracted to biodiversity work associated with the project, including additional investment by partners?

A breakdown of additional resources raised, is given in Appendix VIII. These included the DI-leveraged donation of a full set of herbarium cabinets worth £6,000 from the Chicago Field Museum and inter-continental freight charges part-paid by the British Bryological Society. There remains a £4,000 shortfall in the funding to pay for the setting-up of the Herbarium at UMAG, which the project team members are seeking to address through approaches to other donors since the project end.

Due to the difficulty of estimating supplemental activity, particularly collaborating staff time inputs, some of the figures in Appendix are approximations. However, team members believe these to be conservative estimates, based on a narrow definition of core project work over and above the time inputs originally planned. In the event, much more un-recorded staff working time was spent in the field, in the laboratory, and during the increased periods of training activity, including post-course support and follow-up working with trainees (see Output Table, Appendix II). Considerable extra collaborator time has also been invested in the project due to the large number specimens collected during the field expeditions, and this has contributed to the ten-fold increase in publications accruing to the project.

- What efforts were made by UK project staff to strengthen the capacity of partners to secure further funds for similar work in the host country and were attempts made to capture funds from international donors?

The project team were successful in attracting additional funding from a wide range of external donors (see Appendix VIII). This gave added impetus to the in-country team’s already excellent track-record in this regard, and project work (especially training) has been able to continue beyond the currency of Darwin funding. However, support for continuation of the important systematic and taxonomic work is

more difficult to secure, and the UK team and their international collaborators are continuing to make applications to external donors in order to carry on and expand this work, e.g. to the US National Science Foundation (pending) and a new application to the Darwin Initiative.

### 13. Sustainability and Legacy

- What project achievements are most likely to endure? What will happen to project staff and resources after the project ends? Are partners likely to keep in touch?

The Darwin project's most "impressive" legacy might be seen as its contribution to the establishment of the vast UNESCO Cape Horn Biosphere Reserve (twice the size of Wales). The DI part in this was significant, funding field work for the evidence-base, part-supporting the salaries of two of the prime movers of this project (Drs Rozzi and Massardo), and funding the publication of the proposal and nomination documents. However, this achievement was also a joint effort of many other proponents and collaborators who were not directly connected with the DI project. As a DI-specific legacy therefore, the infrastructure and equipment of the Bryophyte Laboratory and Herbarium at Universidad de Magallanes and the Field Station at Puerto Williams are the most obvious symbols, and the publications (journal articles and DI-flagged books) are another.

Another institutional legacy is the bryological component of the MSc in Management and Conservation of Sub-Antarctic Resources at UMAG, which DI team members contributed to the programme. This was not planned in the original project design; however, members of the DI project team received recognition for this from the University (see Appendix IX, image ). The accompanying sample video shows students on this course engaged in bryological training.

The human legacy of the DI project resides in the hundreds of individuals from a wide range of stakeholder groups who gained an awareness of the Bryoflora of Chile as a result of DI training activity.

This was especially important in the case of policy- and decision-makers who were sensitised to the importance of the bryophyte-dominated habitats of southern Fuegia, and who contributed to the securing of increased protection for the area through establishment of the Cape Horn Biosphere Reserve.

Bryologically-trained staff are now in place at the target institutions and are carrying on cryptogamic research and training where there was none before.

A less tangible memorial for DI project activity, but one which the team was complimented on by many stakeholders including local administrators and community-groups, was the way that the project helped local people and members of previously disadvantaged indigenous communities to acquire new skills of value in the developing "eco-tourism" economy of the southern Fuegia region. This was a spin-off from the training activities, which had originally been planned mainly for audiences from academia and the natural resource management agencies. However, the combination of extra leveraged funding and the excellent rapport that was built up between team members and local communities in the study area, resulted in a high enrolment of local people in the training events, including several operators of small and medium-sized enterprises (see Appendix XII).

Local project staff, infrastructure and equipment remain in place in Chile and perform an important and expanding role in bryological research and training where there was none before.

UK and Chilean project team members remain in regular communication and are collaborating in follow-up publishing activity and new grant applications at the present time.

- Have the project's conclusions and outputs been widely applied? How could legacy have been improved?

The order-of-magnitude increase in publishing output from this project shows that every effort has been made to disseminate the project's findings, while the broad range of scientific and popular output and the extended training programme also attest to the wide application of the results. Legacy could have been improved at the British end of the project by giving more attention to UK publicity (for example national press releases or media products, instead of a local one). However, team members have given several conference presentations in the UK on the project's outcomes, and they continue to disseminate the work through teaching and publication.

- Are additional funds being sought to continue aspects of the project (funds from where and for which aspects)?

The project team has prepared an application to expand the work begun in southern Fuegia, to include the bryophyte-dominated vegetation of the Antarctic Peninsula (in collaboration with the British and Chilean Antarctic Agencies). This is important due to the impacts of both climate change and increasing visitor numbers in the sub-Antarctic region, and will be submitted to potential donors (including the Darwin Initiative) as soon as possible. A major application to continue and expand the taxonomic survey work in Tierra del Fuego has also been made to the US National Science Foundation. There is still a debt of £4,000 (transport costs) owing on the setting-up of the Darwin Initiative Herbarium at UMAG in Punta Arenas. Project team members have continued to seek small donations from the international bryological community to cover this deficit.

#### **14. Value for money**

- Considering the costs and benefits of the project, how do you rate the project in terms of value for money and what evidence do you have to support these conclusions?

The attraction of approximately £60,000 of extra funding into this Darwin project through leverage from external sources, denotes good value for money on a purely financial basis. The way in which the outputs were exceeded, sometimes by an order of magnitude, also testifies to the good value inherent in the project (e.g. 362 trainees against 36 promised; 37 publications against 3 promised). It has not been possible to quantify all the hidden benefits and "invisible earnings" of this project in terms of conservation awareness and human livelihoods impact. However, the key role that project staff played in the creation of the UNESCO Cape Horn Biosphere stands as a lasting testament to the Darwin Initiative's influence in the region. The project team members are unanimous in their assessment of this project as one of the most enthralling and stimulating experiences of their professional lives. It was a great privilege, made possible by Darwin Initiative funding, for us to be able to follow in the footsteps of Charles Darwin and work in the magnificent and unforgettable environment of "The Uttermost Part of the Earth".

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

<b>Project Contribution to Articles under the Convention on Biological Diversity</b>		
First figure represents % contribution to CBD articles by project end.		
Second figure (in brackets) represents estimate of contribution in original project proposal.		
<b>Article No./Title</b>	<b>Project %</b>	<b>Article Description</b>
<b>6. General Measures for Conservation &amp; Sustainable Use</b>	5 (0)	Develop national strategies that integrate conservation and sustainable use.
<b>7. Identification and Monitoring</b>	30	Identify and monitor components of biological diversity, particularly those requiring urgent conservation; identify processes and activities that have adverse effects; maintain and organise relevant data.
<b>8. In-situ Conservation</b>	5 (0)	Establish systems of protected areas with guidelines for selection and management; regulate biological resources, promote protection of habitats; manage areas adjacent to protected areas; restore degraded ecosystems and recovery of threatened species; control risks associated with organisms modified by biotechnology; control spread of alien species; ensure compatibility between sustainable use of resources and their conservation; protect traditional lifestyles and knowledge on biological resources.
<b>9. Ex-situ Conservation</b>	10 (20)	Adopt ex-situ measures to conserve and research components of biological diversity, preferably in country of origin; facilitate recovery of threatened species; regulate and manage collection of biological resources.
<b>10. Sustainable Use of Components of Biological Diversity</b>	10	Integrate conservation and sustainable use in national decisions; protect sustainable customary uses; support local populations to implement remedial actions; encourage co-operation between governments and the private sector.
<b>11. Incentive Measures</b>		Establish economically and socially sound incentives to conserve and promote sustainable use of biological diversity.
<b>12. Research and Training</b>	10 (20)	Establish programmes for scientific and technical education in identification, conservation and sustainable use of biodiversity components; promote research contributing to the conservation and sustainable use of biological diversity, particularly in developing countries (in accordance with SBSTTA recommendations).

<b>13. Public Education and Awareness</b>	10 (0)	Promote understanding of the importance of measures to conserve biological diversity and propagate these measures through the media; cooperate with other states and organisations in developing awareness programmes.
<b>14. Impact Assessment and Minimizing Adverse Impacts</b>		Introduce EIAs of appropriate projects and allow public participation; take into account environmental consequences of policies; exchange information on impacts beyond State boundaries and work to reduce hazards; promote emergency responses to hazards; examine mechanisms for re-dress of international damage.
<b>15. Access to Genetic Resources</b>		Whilst governments control access to their genetic resources they should also facilitate access of environmentally sound uses on mutually agreed terms; scientific research based on a country's genetic resources should ensure sharing in a fair and equitable way of results and benefits.
<b>16. Access to and Transfer of Technology</b>	20	Countries shall ensure access to technologies relevant to conservation and sustainable use of biodiversity under fair and most favourable terms to the source countries (subject to patents and intellectual property rights) and ensure the private sector facilitates such assess and joint development of technologies.
<b>17. Exchange of Information</b>		Countries shall facilitate information exchange and repatriation including technical scientific and socio-economic research, information on training and surveying programmes and local knowledge
<b>19. Bio-safety Protocol</b>		Countries shall take legislative, administrative or policy measures to provide for the effective participation in biotechnological research activities and to ensure all practicable measures to promote and advance priority access on a fair and equitable basis, especially where they provide the genetic resources for such research.
<b>Total %</b>	<b>100%</b>	<b>Check % = total 100</b>

## Appendix II: Outputs.

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

Code	Total to date (reduce box)	Detail (←expand box)
<b>Training Outputs</b>		
1a	Number of people to submit PhD thesis	-
1b	Number of PhD qualifications obtained	-
2	Number of Masters qualifications obtained	-
3	Number of other qualifications obtained	-
4a	Number of undergraduate students receiving training	-
4b	Number of training weeks provided to undergraduate students	-
4c	Number of postgraduate students receiving training (not 1-3 above)	98, during field training, university workshops, as part of degree training, and Santiago seminar.
4d	Number of training weeks for postgraduate students	38 person-weeks during field training, university workshops, as part of degree training, and Santiago seminar.
5	Number of people receiving other forms of <b>long-term</b> (>1yr) training not leading to formal qualification( i.e not categories 1-4 above)	-
6a	Number of people receiving other forms of <b>short-term</b> education/training (i.e not categories 1-5 above)	264, at university workshops, Santiago Seminar and during local community training events.
6b	Number of training weeks not leading to formal qualification	103 person-weeks at short training events not forming part of formal degree training
7	Number of types of training materials produced for use by host country(s)	5 - i) lecture notes (hard copy and CD), ii) species lists, iii) identification manuals, iv) laboratory practical manuals, v) reference books.
<b>Research Outputs</b>		
8	Number of weeks spent by UK project staff on project work in host country(s)	63, not including non-British and non-Chilean collaborators assisting the project.
9	Number of species/habitat management plans (or action plans) produced for Governments, public authorities or other implementing agencies in the host country (s)	2, see publications no.27 and no.30 (Appendix III).
10	Number of formal documents produced to assist work related to species identification, classification and recording.	13, see publication list (Appendix III).
11a	Number of papers published or accepted for publication in peer reviewed journals	13, see categorised publication list (Appendix III).
11b	Number of papers published or accepted for publication elsewhere	14, see categorised publication list (Appendix III).
12a	Number of computer-based databases established (containing species/generic information) and handed over to host country	-

12b	Number of computer-based databases enhanced (containing species/genetic information) and handed over to host country	-
13a	Number of species reference collections established and handed over to host country(s)	1 – Bryophyte reference herbarium collection and living culture collection at UMAG (plus subsidiary field reference collection at Puerto Williams)
13b	Number of species reference collections enhanced and handed over to host country(s)	-

<b>Dissemination Outputs</b>		
14a	Number of conferences/seminars/workshops organised to present/disseminate findings from Darwin project work	7, includes DI training workshops where project outputs were disseminated (Appendix XII).
14b	Number of conferences/seminars/ workshops <b>attended</b> at which findings from Darwin project work will be presented/ disseminated.	7* - BAS, BBS, DI, IAB, ABLs, IEB (x2). Appendix XII.
15a	Number of national press releases or publicity articles in host country(s)	3, see Appendix III.
15b	Number of local press releases or publicity articles in host country(s)	3, see Appendix III.
15c	Number of national press releases or publicity articles in UK	-
15d	Number of local press releases or publicity articles in UK	1, Queen Mary University magazine article (see Appendix III).
16a	Number of issues of newsletters produced in the host country(s)	3 (annual newsletters of Omora Foundation detailing DI project activities).
16b	Estimated circulation of each newsletter in the host country(s)	2,500
16c	Estimated circulation of each newsletter in the UK	-
17a	Number of dissemination networks established	-
17b	Number of dissemination networks enhanced or extended	1 (project contribution to Omora Foundation newsletter).
18a	Number of national TV programmes/features in host country(s)	1 (Chilean national TV documentary highlighting Omora Foundation-DI work).
18b	Number of national TV programme/features in the UK	-
18c	Number of local TV programme/features in host country	2 (local coverage of DI outreach and training activity in Punta Arenas and Puerto Williams – see accompanying sample video)
18d	Number of local TV programme features in the UK	-
19a	Number of national radio interviews/features in host country(s)	1 (radio coverage of Santiago Seminar)
19b	Number of national radio interviews/features in the UK	-
19c	Number of local radio interviews/features in host country (s)	4 (radio features on project activity in Punta Arenas and Puerto Williams).



19d	Number of local radio interviews/features in the UK	-
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<b>Physical Outputs</b>		
20	Estimated value (£s) of physical assets handed over to host country(s)	£40,000 – cryptogamic laboratory and equipment (£29,000) plus leveraged herbarium facility (£11,000).
21	Number of permanent educational/training/research facilities or organisations established	2 – cryptogamic laboratory and herbarium facility.
22	Number of permanent field plots established	-
23	Value of additional resources raised for project	Approximately £60,000 – additional staff time, travel and subsistence, training support, herbarium facility etc (see breakdown in AppendixVIII).

\*BAS – British Antarctic Society Conference 2006

BBS – British Bryological Society Annual General Meeting and Paper Reading 2006

DI – Darwin Initiative Annual Meeting and Exhibition 2006

IAB – International Association of Bryologists Biennial Congress 2007

ABLS – American Bryological and Lichenological Society Symposium 2007

IEB – Millennium Institute for Ecology and Biodiversity (Santiago) Conferences 2006 and 2007

### Appendix III: Publications.

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

MATERIALS PUBLISHED BY DARWIN INITIATIVE-SUPPORTED PERSONNEL RESULTING FROM WORK CARRIED OUT DURING THE CURRENCY OF THE DI PROJECT.

Copies of publications are available from the Project Manager: Dr S Russell, Director, Wales Environment Research Hub, Environment Centre Wales, Deiniol Road, Bangor, Gwynedd LL57 2UW, UK. Journal article reprints are free of charge and books (published in Chile) are priced on application due to differing exchange rates and postal charges.

[P] = Peer reviewed; [N] = non-peer reviewed; [S] = species identification, classification & recording; [M] = management planning.

1. Baird Callicott J, Rozzi R, Delgado L, Monticino M, Acevedo M & Harcombe P (2006). Biocomplexity and Conservation of Biodiversity Hotspots: Three Case Studies from the Americas. *Phil Trans Roy Soc (B)*(1/12/2006): 1-14. [P]
2. Bell NE, Quandt D, O'Brien TJ & Newton AE (2007). Taxonomy and phylogeny in the earliest diverging pleurocarps: square holes and bifurcating pegs. *Bryologist* 110(3): 533-560. [P][S]
3. Buck WR (2004). Exploración briológica en cabo de Hornos, Parte I. *Briolatina* 51: 1-4. [N][S]
4. Buck WR (2005). Exploración briológica en cabo de Hornos, Parte II. *Briolatina* 52:1-4. [N][S]
5. Buck WR (2005). Exploración briológica en cabo de Hornos, Parte III. *Briolatina* 53:1-5 August. [N][S]
6. Buck WR & Bell, N (2005). *Updated Checklist of the Mosses of Isla Navarino*. Omora Foundation, Chile. [N][S]
7. Carafa A., Duckett JG, Knox JP and Ligrone R. (2005). Distribution of xylans in bryophytes and tracheophytes: new insights into basal interrelationships of land plants. *New Phytologist* 168, 231-240. [P]
8. Duckett JG & Pressel S (2005). To the Ends of the Earth. *Queen Mary Bulletin* 30:10-11. [N]
9. Engel JJ & Smith Merrill J (2004). Austral Hepaticae. 35. A taxonomic and phylogenetic study of Telaranea (Lepidoziaceae), with a monograph of the genus in temperate Australasia and commentary on extra-Australasian taxa. *Fieldiana* NS 44:i-iv, pp1-265. [P][S]
10. Engel JJ (2005). Austral Hepaticae 38. The gynoeceum of *Trichotemnoma* (Steph.) Schust., together with a re-evaluation of the taxonomic position of *Trichotemnomaceae* Schust. and comments on family endemism in south temperate areas. *Nova Hedwigia* 80:367-385. [P][S]
11. Goffinet B, Buck WR, Massardo F & Rozzi R (2006). *The Miniature Forests of Cape Horn/Los Bosques en Miniatura del Cabo de Hornos*. Universidad de Magallanes / Fundacion Omora. Editorial Fantástico Sur, Punta Arenas. ISBN 956-7189-34-X [N][S]
12. Jax K & Rozzi R (2004). Ecological theory and values in the determination of conservation

goals: examples from temperate regions of Germany, United States of America, and Chile. *Revista Chilena de Historia Natural* 77: 349-366. [P]

13. Ligrone R, Carafa A, Bonfante P, Biancotto V & Duckett JG (2007). Glomeromycotean associations in liverworts: a molecular, cytological and taxonomical survey. *American Journal of Botany* 94:1756-1777. [P][S]
14. Matcham HW & Duckett JG (2008). New national and regional records. *Aloina brevirostris*, *Pterygoneurum ovatum*, *Vittia elimbata*. *Journal of Bryology* (in press) [S]
15. Matcham HW, Pressel S, Russell S, Massardo F & Duckett, JG (2007). Inventory and Conservation of the Bryoflora of south-western Patagonia. *Field Bryology* 93: 2-7. [N][S]
16. Medina Y, Fernandoy J, Massardo F, Caballero P, Russell S, Rozzi R.(2007). Garden of the Miniature Forests of Cape Horn: Omora Ethnobotanical Park´s initiative for cryptogamic flora conservation. *Proceedings III Reunion de la Sociedad Binacional de Ecologia*, August 2007. [N]
17. Pressel S, Davis EC, Ligrone R & Duckett JG (2008). An ascomycetous endophyte induces branching and septation of the rhizoids in the leafy liverwort family Schistochilaceae (Jungermanniidae, Hepaticopsida). *American Journal of Botany* (in press). [P]
18. Pressel S, Ligrone R & Duckett J G (2008). The ascomycete *Rhizoscyphus ericae* elicits a range of host responses in the rhizoids of leafy liverworts; an experimental and cytological analysis. *Fieldiana* (in press). [P]
19. Quandt D, Bell NE & Stech M (2007). Unravelling the knot: the Pulchrinodaceae fam. nov. (Bryales). *Nova Hedwigia* 131:21–39. [P][S]
20. Renzaglia KS, Duff RJ, Ligrone R, Shaw J, Mishler BD & Duckett JG (2007). Bryophyte phylogeny: advancing the molecular and morphological frontiers. *Bryologist* 110; 179-213. [P]
21. Rozzi R. (2004). Integrando los modos de conocer y convivir con la diversidad biocultural. *Revista Ambiente y Desarrollo* XX(1):83-85. [P]
22. Rozzi R. (2005). Biodiversità e benessere: il caso del Sud America. *Environmental Philosophy* March 2005. ([www.filosofia-ambientale.it](http://www.filosofia-ambientale.it)). [N]
23. Rozzi R (2006). Biodiversidad en la Educacion Informal Turismo Sostenible en Cabo de Hornos. In: *Biodiversidad de Chile, Patrimonio y Desafios* Chap IV: El Hombre y la Biodiversidad pp628-630. CONAMA, Santiago de Chile. [N][M]
24. Rozzi R (2006). Dieci principi per la conservazione bioculturale nella punta sud delle Americhe: l'approccio del Parco Ethnobotanico di Omora. *Environmental Philosophy* November 2006. ([www.filosofia-ambientale.it](http://www.filosofia-ambientale.it)). [N]
25. Rozzi R, Armesto J, Goffinet B, Buck W, Massardo F, Silander J, Kalin-Arroyo M, Russell S, Anderson CB, Cavieres L, Callicott B (2007). Changing lenses to assess biodiversity: patterns of species richness in sub-Antarctic plants and implications for global conservation. *Frontiers in Ecology and the Environment* (online). [P][S]
26. Rozzi R, Charlin R, Ippi S & Dollenz O (2004). Cabo de Hornos: Un parque nacional libre de especies exóticas en el confín del mundo. *Anales del Instituto de la Patagonia* 32: 55-62. [P]

27. Rozzi R, Massardo F & Anderson CB (eds) (2004). *The Cape Horn Biosphere Reserve: a Proposal of Conservation and Tourism to Achieve Sustainable Development at the Southern End of the Americas*. Ediciones Universidad de Magallanes, Punta Arenas, Chile. pp263. ISBN 956-7189-23-4 [N][M]
28. Rozzi R, Massardo F, Anderson CB, Heidinger K & Silander J (2006). Ten principles for biocultural conservation at the southern tip of the Americas: the approach of the Omora Ethnobotanical Park. *Ecology and Society* **11**(1): Article 43 (pp27). [P]
29. Rozzi R, Massardo F, Anderson CB & Silander J (2004). Ten dimensions of a biocultural conservation approach at the southern tip of the Americas. *Sustainable Communities Review* 7(1): 74-83. [P]
30. Rozzi R, Massardo F, Berghöfer A, Anderson CB, Mansilla A, Mansilla M, Plana J, Berghöfer U, Araya P & Barros E (2006). *Cape Horn Biosphere Reserve Nomination Document for the Incorporation of the Cape Horn Archipelago Territory into the World Biosphere Reserve Network MaB Program - UNESCO*. Ediciones Universidad de Magallanes, Punta Arenas, Chile. pp263 . ISBN N° 956-7189-31-5. [N][M]
31. Russell S (2006). Bryophytes of Southern Chile. *Field Bryology* 89: 13-14. Paper read at Annual General Meeting and Conference of the British Bryological Society. University of Wales, Bangor, 10 September, 2005. [N]
32. Sherriffs M, Ippi S, Anderson CB, Rozzi R & Zúñiga A (2004). *Explorando la Micro-Biodiversidad del Cabo de Hornos - Guías y actividades* (pp98). Fundación Omora, Puerto Williams, Chile. [N][S]

RELEVANT ANCILLARY MATERIAL PUBLISHED BY DI-SUPPORTED PERSONNEL DURING THE CURRENCY OF THE PROJECT .

33. Gonzalez N, Massardo F & Rozzi R (2007). “*Miniature Forests of Cape Horn*” environmental education package, with script for touring puppet show including poems and songs. Omora Foundation, Chile.
34. Massardo F. & Rozzi R (2006). *The World’s southernmost Ethnoecology: Yaghan Craftmanship and Traditional Ecological Knowledge*. Gobierno Regional de Magallanes y Antartica Chilena. ISBN 956-7189-37-4.
35. Rozzi R & Heidinger K (2006). *The Route of Darwin Through the Cape Horn Archipelago*. Gobierno Regional de Magallanes y Antartica Chilena. ISBN 956-7189-35-8
36. Rozzi R, Massardo F, Mansilla A, Anderson CB & Plana J (2006). *The Virgin Landscapes of the Cape Horn Biosphere Reserve*. Gobierno Regional de Magallanes y Antartica Chilena. ISBN 956-7189-36-6.
37. Zarraga C, Massardo F & Rozzi R (2006). *Learning, Listening the Yaghan World*. Ediciones Universidad de Magallanes. ISBN 956-7189-32-3.

DI project part-funding was also used to publish a series of colour posters on southern Chilean natural history and ecology, to support the project’s ongoing environmental education and outreach work in schools and other public institutions throughout Chile.

## Examples of Media Coverage of Project and Outcomes

- Anon (2003 - pre-project phase). Bosques en Miniatura: Embajada Britanica Financia Investigacion en Cabo de Hornos. La Prensa Austral, 3 January 2003.
- Anon (2005). Sera pionero en sudamerica. Crearan primer laboratorio de cultivo de musgos. Grupo de trabajo inicio expedicion floristica al Cabo de Hornos. La Prensa Austral, 23 January 2005.
- Anon (2007). Innovador "Turismo con Lupa" se difunde en la Facultad de Ciencias. En curso teórico-práctico interdisciplinario organizado por el Instituto Milenio de Ecología y Biodiversidad de dicha unidad académica. Newsletter of the Science Faculty of the University of Santiago de Chile.
- Anon (2007). Promueven turismo científico en XII Region. El llamado "turismo con Lupa" estudia los musgos, hepaticas y líquenes unicos de esa region ecoturistica (p35). La Tercera 25 June 2006.
- Anon (2007). Reserva de las Biosfera de Cabo de Hornos: Parque Omora se abrirá al turismo "con lupa". La Prensa Austral 28 Jan 2007.
- Buck WR (2006). "The Marvellous Moss". Repeat radio broadcasts during November 2006. "Pulse of the Planet", National Public Radio, USA.
- Roach J (2006). Unique Mosses Spur Conservation, Ecotourism in Southern Chile. National Geographic News, 14 November, 2006.
- Rozzi, R et al (2007). Biodiversity Of Southernmost Forests And Tundra Ecosystems (adapted). *Science Daily* - 26 October, 2007. Ecological Society of America.
- Sample Articles re. Proclamation of Cape Horn Biosphere Reserve:
- [La Prensa Austral](#) August 2, 2005
- [Que Pasa](#) July 25, 2005
- [La Prensa Austral](#) July 23, 2005
- [Botella al Mar](#) July 16, 2005
- [The Red and Black](#) July 14, 2005 (In English)
- [La Tercera](#) July 10, 2005
- [press release](#) July 6, 2005 (In English)
- Ministry of Education [press release](#) July 2, 2005
- [La Prensa Austral](#) June 30, 2005
- [La Tercera](#) June 30, 2005
- [El Mercurio](#) June 30, 2005
- [La Nación](#) June 30, 2005
- [Radio Cooperativa](#) June 30, 2005
- [Terra Chile](#) June 30, 2005
- [El Mostrador](#) June 30, 2005
- UNESCO press releases in [English](#) and [Spanish](#)
- Chilean ambassador's [press release](#)

## Appendix IV: Logical Framework as per Original Project Application.

Project summary	Measurable indicators	Means of verification	Important assumptions
<b>Goal:</b> 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			
<b>Purpose</b> To better understand and conserve the threatened Magellanian "bryo-diversity hotspot" in southern Chile	Completed survey and inventory; nos. of research publications; nos. of trained specialists; lab facility established; nos. of contributions to conservation plans and initiatives	UK and Chilean project reports; international article citations; training reports/feedback; conservation agency reports	Availability of personnel over three years; timeous publication of results; ongoing government and institutional support in Chile
<b>Outputs</b>			
Knowledge of Fuegian bryophyte diversity significantly improved	Comprehensive inventory of Fuegian bryophyte species published	Appearance of new Fuegian bryophyte list in international journal	Commitment of project partners to outputs on schedule
Enhanced understanding of relationships and functioning of Fuegian bryophyte vegetation	Research papers on taxonomy, biogeography and ecology of Fuegian bryophytes produced	Appearance of publication series in bryological and/or conservation journals	Judicious selection of print media for early and wide publication of results
Capacitation of local biologists for bryological survey, research and conservation.	Completion of 2-week course in bryophyte culture and conservation for 12 Chilean & Argentinean biologists.	Course report and feedback forms, plus BBS bulletins	Sufficient engagement of local biologists with training initiative
Chilean conservation agencies and natural resource users influenced to protect bryophyte-rich habitat	Completion of 2x1-week courses for 24 Chilean conservation and forestry staff, and representatives of farming and tourism sectors	Course report and feedback forms, BBS bulletins and conservation agency field reports	Interest of trainees from conservation/forestry agencies, and the farming and tourism sectors sustained
Local capacity for in vitro culture of endangered cryptogam species established	In vitro facilities established and functioning, and staff trained at UMAG/IP	UMAG research reports, BBS bulletins and Darwin reporting	Ongoing UMAG commitment to project, and staff availability
Conservation of Fuegian vegetation and habitats enhanced	Project inputs to Biodiversity Action Plan and regional development plan secured	CONAMA reports on BAP progress, Magellanian Region Development Plan process documents	Continued support for Fuegian bryo-diversity initiative from regional and local interests
<b>Activities</b>	<b>Activity Milestones (Summary of Project Implementation Timetable)</b>		
Year 1 Field Survey Bryology training course In vitro lab established	Year 1 expedition and survey completed 1/2005 Chilean bryological and in vitro culture training course completed 2/2005 In vitro laboratory staff and facilities functioning at Instituto de la Patagonica 2/2005		
Preliminary results Year 2 Field Survey Conservation courses	Early scientific outcomes appearing in reports and bulletins 5/2005 Year 2 expedition and survey completed 2/2006 Conservators and resource-users courses completed 2/2006		
Conservation impact Year 3 Results Reporting	Recommendations presented - biodiversity action and regional development plans 5/2006 Full inventory and first formal international research publications appearing 3/2007 Darwin final report 3/2007		

**APPENDIX V: Darwin Initiative Training Events.**

<b>Title/Content</b>	<b>Dates</b>	<b>Location</b>	<b>Numbers of Trainees</b>
Laboratory bryology	5-9/1/05	UMAG	6
Field bryology	10-14/1/05	Punta Arenas	3
Field bryology and eco-guiding (ship-borne)	15-20/1/05	Western Fuegia	7
Laboratory bryology	21-22/1/05	Puerto Williams	4
Field bryology and eco-guiding (ship-borne)	23-29/1/05	Southern Fuegia	8
Sustainable Tourism in Protected Areas	4-5/8/05	Santiago	156
Exploring and Conserving the Miniature Forests of Cape Horn	9-11/6/06	Puerto Williams	20
Protected Area Management and Planning (Cape Horn Biosphere Reserve)	13/6/06	UMAG Punta Arenas	26
Theoretical and Laboratory Bryology	14-15/6/06	UMAG Punta Arenas	8
Exploring and Conserving the Miniature Forests of Cape Horn and Magallanes	16-17/6/06	UMAG Punta Arenas	20
Bryology and Conservation	19/6/06	Universidad de Los Lagos, Osorno	8
Tourism with a Handlens	20/6/06	IEB Santiago	32
Tourism with a Handlens	21/6/06	UAB Vina del Mar	56
Bryology and Conservation (including Field Trip)	21-22/6/06	UAB Field Station	23
Miniature Forests of Cape Horn (Bryology and Ecotourism)	11-18/8/07	Puerto Williams	50
Field and Laboratory Bryology	30/8-10/9/07	UMAG Punta Arenas	12
Bryology and Environmental Education (with Senda Darwin Foundation)	13-15/9/07	Chiloe	3
Total 17 short courses	Total 60 training days		Total event-trainees 442*

UMAG = Universidad de Magallanes, Punta Arenas

IEB = Millennium Institute for Ecology and Biodiversity, University of Santiago

UAB = Universidad Andres Bello, Vina del Mar

\*Some of these participants received training at more than one event. The number of individuals receiving training was 362.

### Appendix VII: Darwin Contacts.

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

<b>Project Title</b>	Inventory and Conservation of the Bryoflora of South Western Patagonia
<b>Ref. No.</b>	13024
<b>UK Leader Details</b>	
Name	Prof Jeff Duckett
Role within Darwin Project	Team Leader
Address	Department of Biological and Chemical Sciences, Queen Mary, University of London, Mile End Road, London E1 4NS.
Phone	
Fax	
Email	
<b>Other UK Contact (if relevant)</b>	
Name	Dr Shaun Russell
Role within Darwin Project	Project Manager
Address	Environment Centre Wales, Deiniol Road, Bangor, Gwynedd LL57 2UW
Phone	
Fax	
Email	
<b>Partner 1</b>	
Name	Dr Francisca Massardo
Organisation	Associate Professor, Universidad de Magallanes
Role within Darwin Project	In-country project leader
Address	Departamento de Ciencias y Recursos Naturales, Universidad de Magallanes, Avenida Bulnes 01855, Punta Arenas, Chile
Fax	
Email	
<b>Partner 2 (if relevant)</b>	
Name	Dr Ricardo Rozzi
Organisation	Director, Omora Foundation
Role within Darwin Project	In-country project management
Address	Omora Foundation, Puerto Williams, Isla Navarino, Region XII, Chile.
Fax	
Email	



**APPENDIX VIII: Additional Resources Raised.**

<b>Item</b>	<b>Promised</b>	<b>Actual</b>
Travel and subsistence	£6,000	<b>£12,000</b> (additional £6,000 contributions to travel and subsistence for workshop series, from Eurochile, international collaborators and project staff).
Conferences and Seminars	£2,000	<b>£8,000</b> (additional £6,000 contributions to conference and seminar costs from Eurochile, SERNATUR and the British Embassy).
Capital items	£8,000 UMAG laboratory and greenhouse	<b>£19,000</b> (additional £11,000 - value of 30 Herbarium cabinets @ £200 each from Chicago field Museum, and transport from Chicago to Punta Arenas (£5,000) part-paid by BBS (£4,000 outstanding).
Other expedition logistics	£4,000	<b>£6,000</b> (additional £2,000 contributions to fuel and food from Eurochile, COMAPA and collaborators.
International specialists' time	£15,000	<b>£25,000</b> (additional £10,000 equivalent staff time from international collaborators (USA, Denmark, Germany, Finland, Spain, Korea) who contributed to the project in Chile (field studies, lab research and training).
UK and Chilean staff time	£46,960	<b>£74,960</b> (additional £25,000 equivalent staff time from UK and Chilean project staff and collaborators (names listed below in Appendix IX).
Total	£81,960	<b>£144,960</b>

**Core staff**

<b>Name</b>	<b>Country</b>	<b>Institution</b>
Prof JG Duckett	UK	Dept Biological & Chemical Sciences, Queen Mary University of London
Dr S Russell	UK	Director, Wales Environment Research Hub, Bangor University
Dr F Massardo	Chile	Dept of Science and Natural Resources, Universidad de Magallanes, Punta Arenas
Dr R Rozzi	Chile	Director, Omora Foundation, Puerto Williams

**Collaborators contributing to Darwin Initiative in-country project research and training activities.**

<b>Name</b>	<b>Country</b>	<b>Institution</b>
Dr S Pressel	UK	Dept Biological & Chemical Sciences, Queen Mary University of London
H Matcham	UK	British Bryological Society
Dr N Bell	UK	Formerly Natural History Museum (London), now University of Helsinki (Finland)
Prof S Harrop	UK	Professor of Wildlife Law, University of Kent at Canterbury
Prof H Goodwin	UK	Director, International Centre for Responsible Tourism, Leeds Metropolitan University.
Dr J Chavez	UK	Associate, International Centre for Responsible Tourism, Leeds Metropolitan University
L Thompson		Project Assistant, Queen Mary University of London
J Roberts	UK	Access and Recreation Officer, Countryside Council for Wales.
J Chorley	UK	Project Assistant, University of Wales, Bangor.
Prof A Mansilla	Chile	Dept of Science and Natural Resources, Universidad de Magallanes, Punta Arenas
Prof M Acevedo	Chile	Andres Bello University, Vina del Mar
X Arango	Chile	Omora Foundation, Puerto Williams
N Navarro	Chile	Omora Foundation, Puerto Williams
Kristin Hoelting	Chile	Omora Foundation, Puerto Williams
E Garcia de la Huerta		Omora Foundation, Puerto Williams
Dr M Sheriffs		Omora Foundation, Puerto Williams
Dr CB Anderson		Omora Foundation, Puerto Williams
Dr W Buck	USA	New York Botanical Garden
Dr J Engel	USA	Field Museum of Natural History, Chicago
Dr I Holz	Germany	Botanical Institute, Greifswald University
Prof L Sancho	Spain	Universidad Complutense de Madrid
Dr R Vilches	Spain	Universidad de Madrid
Dr J Etayo	Spain	Universidad de Pamplona
Dr A Gomez	Spain	Universidad de Barcelona
Prof Ming Sum Boo	Korea	Chungnam National University
Dr U Sochtig	Denmark	University of Copenhagen