Darwin Initiative for the Survival of Species

Final Report

An integrated conservation programme for threatened endemic forest species in Chile

April 2002 - April 2005 (extended to May 2005)

162/11/012

Royal Botanic Garden Edinburgh & Universidad Austral de Chile (UACh)

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Acronyms Used in this Report

BIOCORES	Biodiversity Conservation, Restoration and Sustainable Use in Fragmented Landscapes
CBD	Convention on Biological Diversity
FONDEF	Fondo de Fomento al Desarrollo Científico y Tecnológico
GSPC	Global Strategy for Plant Conservation
INIA	Instituto de Investigaciones Agropecuarias
ODEPA	Oficina de Estudios y Politicas Agrarias
RBGE	Royal Botanic Garden Edinburgh
UACh	Universidad Austral de Chile

1. Darwin Project Information

Project Reference No.	162/11/012
Project title	An integrated conservation programme for threatened endemic forest species in Chile
Country	Chile
UK Contractor	Royal Botanic Garden Edinburgh
Partner Organisation (s)	Universidad Austral de Chile (UACh)
Darwin Grant Value	£166 505
Start/End date	April 2002 - April 2005 (extended to May 2005)
Author(s), date	P Thomas, M Gardner, P Hechenleitner, C Echeverria, A Lara September 2005

2. Project Background/ Rationale

The rainforests of southern and central Chile represent one quarter of the world's remaining temperate rainforests and are rich in endemic species. Over the last 30 years, there has been a widespread reduction and fragmentation in native forests as a result of conversion for agriculture, an increase in fires, exploitation for firewood and woodchips and replacement with commercial forestry plantations. This has been particularly severe in the coastal regions of southern central Chile where many of the endemic species occur. Many of the remaining fragments of native forest with threatened endemic species are on private land owned either by small landowners or forestry companies.

The increasing concern about forest conservation has been accompanied by the gradual development of wide ranging research programmes on the ecology, conservation and sustainable use of native forests within key universities such as Universidad Austral de Chile (UACh). Most of these have developed within Forestry Institutes that were previously focussed on commercial forestry.

In 2000, two senior staff from UACh, Professor Antonio Lara and Professor Carlos Le Quesne, visited RBG Edinburgh (RBGE) to discuss developing a programme integrating both in-situ and ex-situ conservation measures. RBGE was chosen as its International Conifer Conservation Programme (ICCP) had already been involved in conservation work in Chile for over 20 years and was experienced in integrating ex-situ and in-situ conservation.

The aim would be to help local landowners protect threatened endemic forest trees and shrubs on their land and develop the arboretum at UACh as an ex-situ and training centre, with the eventual goal of establishing it as one of South America's leading conservation centres. Linking this with training of researchers in plant collection management and biodiversity assessment was identified as crucial. Additionally, it was also recognised that there was a need to secure longer term funding, possibly through the commercialisation of horticulturally worthy Chilean native plants under a Benefit Sharing Agreement. The Darwin project 'An integrated conservation programme for threatened endemic forest species in Chile' was the result.

3. Project Summary: Purpose and objectives

3.1 Project purpose

To provide Chilean researchers and local land-owners with the knowledge and skills to enable them to protect populations of threatened forest species not included in Chile's network of protected areas, by integrating ex-situ with in-situ conservation.

3.2 Project objectives

1) training for key horticultural and scientific personnel in ex-situ and in-situ conservation methodologies;
2) agreements with private landowners in order to protect key endemic species;
3) habitat management plans;
4) two manuals;
5) international benefit sharing agreement.

3.3 Logframe

The original logframe that was submitted was revised at the end of Year 2. This version is still current and is included in this report as Appendix 5.

3.4 Modifications to original objectives or operational plan

In the first year the management structure of the project was modified; in Chile Cristian Echeverria became joint leader with Prof. Antonio Lara and Paulina Hechenleitner the field co-ordinator. The timing of various activities were changed as a result of commitments of the staff involved e.g. database installation took place 2 months early and planned publicity releases were deferred to the second year.
In the second year of the project Prof. Antonio Lara took a 12 months sabbatical leave at Harvard University in the USA. During his sabbatical he remained closely involved with the negotiations for the benefit sharing agreement. Paulina Hechenleitner, the field co-ordinator, spent 2 months (October-November 2003) in China undergoing training in bamboo cultivation as part of her duties as Curator of the Arboretum in UACh.
In the third year the final field visit and final project seminar were scheduled for January 2005; these were brought forward to November and December 2004 to allow more time for the production of scientific papers and identification manuals and so that a workshop on genetic conservation could be organised. The project was due to be completed on March 31, 2005. Due to an accident involving a relative of one of the Chilean staff, a 3 month extension was agreed with the Darwin Secretariat to allow for the completion of major outputs. This is the only modification that required the approval of the Darwin Secretariat. The overall objectives of the project did not change.

3.5 Project Contribution to CBD Articles

The project was originally designed to address the following articles

- Article 6 & 7:- monitoring, through sampling and research the components of biological diversity in urgent need of conservation measures);
- Article 8b:- in-situ-conservation - establishing a system of protected areas and through research help to develop guidelines for the selection, establishment and management of these areas
- Article 9:- ex-situ conservation of threatened species in Chile for research and their conservation

- Articles 12/16/18 training of local personnel through scientific and technical collaboration
- Article 15:- Benefit Sharing Agreement

The approximate percentages for the various articles are detailed in Appendix 1 of this report.

3.6 Success in meeting objectives

3.6.1 Objective 1: training for key horticultural and scientific personnel in ex-situ and in-situ conservation methodologies;

Throughout the project there has been an emphasis on 'on the job training' involving university graduates, protected area staff and forestry company employees. The majority of the people who have been involved in the training and the work of the project have maintained contact and continue to exchange ideas, information and material. Three Chilean graduates spent up to 6 months each in the UK receiving training in horticulture and botanic garden management or undergoing training in molecular aspects of the conservation of threatened Chilean species.

3.6.2 Objective 2 & 3: agreements with private landowners in order to protect key endemic species; habitat management plans;

By the end of the project 6 agreements covering a total of 10 sites had been negotiated. Management plans have been produced for the majority of them; others are still under development. Restoration work has been initiated at three sites while others continue to be monitored. Some of these agreements involve the joint management of native forest fragments with particular threatened species that are owned by private forestry companies. These are the first such agreements in Chile. The project leaders have successfully obtained extra funding in order to support the salaries and field costs of project staff so that they can continue and develop both the work with the companies and that with the sites owned by small landowners over the next 3 years. Copies of these agreements are included as Appendix IX.

3.6.3 Objective 4: manuals for the management of living conservation plant collections and the propagation of threatened endemic plants.

The project has produced a single, Spanish language, 188 page, full colour, identification and propagation book that covers 46 key threatened woody species from southern and central Chile. It includes an overview of the current state of conservation in Chile, identification information for each of the species profiled, a review of the conservation status of each species using IUCN 2001 Categories and criteria as well as information for the cultivation, propagation and management of these threatened species. This is the most comprehensive publication on threatened woody Chilean plants since the original Red data book was published in 1989. One thousand copies were printed; 750 have already been distributed. A hard copy is included as Appendix VI. The English mastercopy of the text is included as Appendix VII. (Note: this version is slightly different to the Spanish version and still contains small sections that are in Spanish). The project is planning a full English version and aims to have this published by March 2006. Please refer to Outputs section for details relating to the second manual.

3.6.4 Objective 5: international benefit sharing agreement.

This has been the second major success for the project and it has taken a considerable amount of staff time and project resources, especially in the last 18 months. The result has been two agreements covering the commercialisation of Chilean plants for sale in the UK.

The first agreement is an Access to Genetic Resources Agreement between the RBGE and the Instituto de Investigaciones Agropecuarias (INIA). INIA is the Chilean authority responsible for access to genetic resources and for ensuring compliance with the Convention on Biological Diversity.

The second agreement is between the RBGE, UACh and Liss Forest Nurseries; it regulates the actual commercialisation of selected Chilean native species. This agreement was approved by INIA.
These are the first agreements of their kind between Chile and the UK. Hardcopies are included as Appendices VIII and IX.

3.7 Additional Accomplishments/ Leverage

Gonzalo Medel, the first 'Darwin Postgraduate Scholar' to come to the UK, has recently been offered a PhD at UACh. Darian Stark, the second Scholar successfully completed the MSc course Biodiversity and Taxonomy offered by the RBGE and University of Edinburgh after his training with the project finished. Funding for Darian's MSc came from within the RBGE. Camilla Martinez, the third Scholar is undertaking a PhD through UACh, RBGE and the University of Edinburgh. Her subject is the phytogeography of the Magellanic bogs in Chile and Argentina. Funding for this PhD has been obtained from the University of Edinburgh's Darwin Trust.

Carlos Zamorano is due to start an MSc at El Colegio De La Frontera Sur (Ecosur) in Chiapas, Mexico in January 2006. Paulina Hechenleitner has been accepted for the MSc 'Biodiversity and Taxonomy of Plants at the RBGE and University of Edinburgh; she is due to start in September 2006. Carlos and Paulina are being supported through the Catherine Olver Fund which was set up by project leaders in the second year of the project as a result of a £200k bequest from a private individual in the UK. This fund, along with a recent award of £30k over 3 years from the UK's Bromley Trust will also support the continuation of the work that the project initiated with private landowners. These additional funds were the direct result of public lectures about the work of the Darwin Initiative given by the UK project leader, Martin Gardner (see Appendix XXXI).

Daniela Weber, a horticulturist who joined the project in its third year, was awarded a Darwin Initiative Scholarship in May 2005. The aim of the scholarship is to test the protocols of the commercialisation agreement as well as providing additional training in conservation collection management. Matched funding for her has been raised from the Royal Horticultural Society, within UACh and other private sources in the UK.

Cristian Echeverria successfully completed his PhD at the University of Cambridge in June 2005. His thesis focussed on fragmentation of native forests in Chile. Cristian has also been working with UNEP-WCMC on the development of indicators for forest
fragmentation, based on his work for BIOCORES. The proposals look likely to be accepted by the Convention for Biological Diversity as part of its set of indicators for measuring biodiversity loss towards the 2010 target.

Prior to the start of the project, UK and Chilean project members were involved in the establishment of the Nasampulli private nature reserve near Lago Caburgua in the Andes. This reserve has been established to help protect important stands of the *Araucaria araucana,* a threatened conifer which is presently the focus of much concern due to habitat loss from wild fires. In the course of the project, staff were involved in successful negotiations with Rainforest Concern over the purchase of surrounding areas. The reserve has now expanded to cover more than 500ha. The Darwin project has featured in the Rainforest Concern's in house journal and there is a good possibility that Rainforest Concern will become involved in the purchase of native forests in other areas where the project has been working, especially in the Coastal Cordillera.

4. Scientific, Training, and Technical Assessment

4.1 Research and Technical Work

4.1.1 General summary

Over the three years of the project, research and technical work focussed on three main areas; the distribution, conservation status, cultivation and genetic variation of threatened woody plants in southern and central Chile, the establishment of agreements with owners of land containing threatened plants that were outside of the existing protected area network and the development of a benefit sharing agreement (BSA).

The majority of the field work relating to distribution and conservation status was undertaken during the 3 main visits by the UK staff. Research on cultivation techniques was undertaken at the UACh arboretum and at the RBGE. Work on genetic variation formed an integral part of the training for the 'Darwin Postgraduate Scholars' during their placements in the UK. Additional field survey work was undertaken by Chilean personnel and during extra visits by the UK leader. Properties for which protection agreements have been made were mainly identified during joint field work. Recently, the BSA has been signed and is now in the early stages of implementation.

Activities in Years 1 and 2 concentrated on general field work, training and establishing and implementing agreements with landowners. These are reported in the annual and half year reports that have already been submitted. Activities in Year 3 have concentrated on four main areas; the consolidation of the existing network, rather than any further expansion, the collation of information for the conservation assessments and the threatened plants manual, final seminars and, most importantly the completion of the Benefit Sharing Agreement.

4.1.2 Staff

UK based staff: main participants and roles in research:

M Gardner (project leader)

P Thomas (coordinator) benefit sharing agreement, field work, landowner agreements, site assessments, conservation assessments

UK based staff: Additional participants and roles

P Baxter, Curator, Benmore Botanic Garden – field work, collections management

P Brownless, Supervisor RBGE nursery; field work, propagation training and cultivation research

Dr P Hollingsworth and Dr M Hollingsworth (Head of Population Genetics and Conservation, Laboratories Manager RBGE); fieldwork, laboratory based research and training in genetic variation of selected threatened species

Dr K Walter Database consultant, training in Chile (Year 1) and Mexico (Year 2)

Mr A Lovatt Temperate Collections Supervisor; Eden Project; field work

Dr Peter Gosling Forestry Commission, Alice Holt Research Station; germination protocols for *Prumnopitys andinus*

Chilean project staff: participants and roles in research

Prof. A Lara; project co-leader, benefit sharing agreement, landowner agreements

Dr C Echeverria; project co-leader, field work, site assessment, conservation assessments; landowner agreements

P Hechenleitner; field coordinator; field work, site assessment, conservation assessments, landowner agreements, propagation training and cultivation research

Dr C LeQuesne; field work, threatened species distribution and conservation assessments, liaison with protected area authorities

G. Medel protected area management (Nasampulli Reserve)

D Stark field work, genetic variation of *Pitavia punctata*

C Martinez field work, genetic variation of *Legrandia concinna* and *Prumnopitys andina*

C Zamorano field work, site assessment, conservation assessments; landowner agreements
F Bustos field work, site assessment, conservation assessments; landowner agreements; propagation work at UACh
D Weber management of ex-situ conservation activities at UACh.

4.1.3 Methodologies

Threatened species: information relating to known and likely localities for threatened species was collated from herbarium records obtained from herbaria in Chile and the UK as well as from the official Red Data Book for Chilean Terrestrial Plants (Benoit 1989), published and unpublished CONAF reports and local sources. From this priority areas were selected on the degree of known threat to individual species (as listed by the Chilean Red Data Book or by current IUCN Redlist) and on the basis of the greatest likely return for each survey period. A concerted attempt was made to sample as widely as possible for species that were selected for genetic work. Species that either had poor or few distribution records, or were part of groups known to be difficult to identify were also prioritised. Information regarding relatively well researched species or those with active conservation programmes (e.g. *Araucaria araucana, Fitzroya cupressoides* and *Nothofagus glauca*) was also collated and included in the manual although they were not actively targeted for field work.

At each site visited, an assessment was made of the conservation status for population(s) of targeted species; DNA samples and voucher specimens were collected along with herbarium specimens of other associated species. Locality data was recorded using GPSs and the information transferred to databases for use in GIS mapping systems.
Discussions with landowners were also held, to explain the nature of the project and determine the sites suitability for establishing agreements. These were followed up and negotiated over the course of the project, mainly by Chilean staff.

Details of each site visit were recorded using a purpose designed sheet. These records will form an important reference source for monitoring these areas in the future. Additionally, formal reports for each of the National Parks/Reserves visited were prepared once identification of the collections had been completed. These should have been included as Appendix XIII. During the preparation of this report, the files were corrupted; new copies have been requested but may not arrive in the UK until early October due to the field work commitments of the Chilean co-ordinator. Additional collections were made of species whose taxonomic or conservation status was uncertain.
Laboratory research involved the use of RAPDs, AFLPs and micro-satellites; details of the methodologies used will be included in the papers that are due to be published.
Conservation assessments were done using IUCN 2001 categories and criteria.

4.1.4 Main findings

Survey work

A total of thirty four species were specifically targeted by the project. Twelve national parks and reserves and more than 50 localities on private land were visited and surveyed. New populations for several threatened species were located and many other reported localities were verified. In some cases previously reported localities had been cleared while in other cases additional threatened species were found.

Conservation status and genetic variation

Eleven species previously assessed as rare were found to be either critically endangered or endangered. Eight were assessed as data deficient while one previously threatened species was assessed as Least Concern. Nine threatened species were found to be outside of any formally protected area although all have had some other type of conservation action initiated.
Genetic investigations for *Pitavia punctata* and *Legrandia concinna* revealed that the most genetically variable populations were outside of the reserve system; in both cases the

project has initiated measures to protect these specific populations. Work on *Prumnopitys* is ongoing.
Further details of the conservation status for each species can be found in the project's main publication, the English mastercopy of the text or in the actual IUCN assessments questionnaires (Appendix VII, VIII & XV).

Propagation and cultivation of threatened species

Propagation protocols for thirteen species have been published in the manual for the first time. These are the result of trials undertaken during the project, using material collected during field surveys. In addition to the genetic work on *Prumnopitys andina*, collaborative research into the germination of this species was undertaken in collaboration with the Alice Holt Research station in the UK. Seed is recalcitrant and it has been difficult to germinate seed reliably for restoration work at places such as Sr Cifuentes. Alice Holt staff developed a technique that has solved these problems (See Appendix XIX).

4.1.5 Peer Review of Research Findings

Scientific papers detailing the results of the genetic work are still in preparation. These will be submitted to peer reviewed journals such as *Biodiversity and Conservation*. Each of the forty six species accounts published in the manual were either reviewed or co-written by recognised authorities within Chile. A list of these people is given on page 13 of Appendix VII. Many of these people were also involved in reviewing the conservation assessments.
Conservation assessments have been sent to Dr Craig Hilton-Taylor at the IUCN monitoring center in Cambridge. Conifer assessments will be forwarded to the Conifer Specialist Groups while the remainder will be sent to the South American Temperate Plants Group for review. After this they will be incorporated into the official IUCN Redlist. The timeframe for this process is outside the control of the project.

4.1.6 Benefit Sharing Agreement

The BSA that has recently been signed involved the preparation of at least six different drafts for each of its two constituent agreements, countless meetings, phone calls and emails. Each draft had to be submitted for comment to three organisations (INIA, UACh and RBGE). In addition to this, Antonio Lara and Cristian Echeverria met with the nursery responsible for commercialising the plants during a visit to the UK. Martin Gardner also visited Chile specifically for discussions with representatives from INIA and CONAMA. This process took a considerable amount of time as many issues relating to the control and responsibility for genetic resources in Chile along with the management and the nature of the benefits required considerable discussion. Eventually, an agreement between INIA and RBGE for initial access to genetic resources was signed, along with a complementary agreement involving RBGE, UACh and Liss Forest Nurseries covering the actual commercialisation. Under this second agreement, UACh is acting on INIA's behalf. A ratio for the allocation of net profits from the sale in the UK of specified plants has been agreed. An account will be set up in Chile to hold the money, and a committee with representatives from INIA, UACh and RBGE will oversee the allocation of funds to conservation projects (See Annex 7 of Appendix IX). Protocols have been worked out to cover issues of prior informed consent, the collecting of material from private land owners and access to monies eventually returned to Chile as part of this agreement. Protocols for the recording and monitoring of material transferred from Chile to the UK have also been developed and are being tested through the work of the current Darwin Initiative Scholar, Srta Daniela Weber. A preliminary flow chart of these protocols is included as Appendix IX/1

A total of 28 species with potential for commercialisation have been identified. These species are specified in Annex 1 of the agreements; any new additions need to be approved by INIA. This annex is **not** included in this report as the identity of the species is commercially confidential and there are specific clauses within the agreement preventing any of the parties from disclosing that information. Some of the species selected are

currently threatened but there are specific clauses within the agreement that prohibit over collection. In the first instance, species have been selected by Martin Gardner, (UK project leader) an acknowledged expert on the Chilean flora and who has more than thirty years experience of cultivating Chilean plants throughout the UK. Further advice has been given by Peter Catt, a respected nurseryman with a well established track record of commercialising plants. Several species are currently being trialled. After considerable discussion of the pros and cons of Plant Breeders Rights (PBRs), all parties agreed that they would not be used as the administration costs would be too expensive. It is unlikely that Trademarks will be used either. The main strategy would be to build up stocks and then flood the market at premium prices.

One of the problems that the project has had to deal with during this process is the management of people's expectations regarding the income that could be generated. Considering the overall number of species in cultivation, very few are commercial goldmines and it is unlikely that any of the targeted species will generate tens of thousands of pounds. However, there are some that do have the potential to generate a significant profit at least when they are first released. The actual amount generated is very difficult to predict. The uncertainty about the commercial success of the BSA raises questions about whether all the effort time and resources that have been invested represents 'value for money'. The long and complicated process has been valuable for several reasons; the situation regarding benefit sharing and access to genetic resources within Chile is much clearer and the Chilean organisations have been able to build on and implement ideas generated from the seminars held during the other Darwin project. The RBGE has also clarified its policies regarding CBD compliance and strengthened its accessioning and curatorial policies within its Living Collections. Within the UK there is a much greater awareness and interest in the implications of the CBD, particularly within the horticultural world. Several nurseries, botanic and private gardens and arboreta have approached the UK project team for advice on how to go about setting up similar agreements in other countries. The Benefit Sharing Agreement has also been a useful factor in securing further funding for post project activities.

4.1.7 UACh Arboretum

The original project proposal included a long-term goal of developing the arboretum into one of South America's leading conservation centres for native threatened woody plants. Over the course of the project significant improvements have been made to enhance its role in the following:

- ex-situ conservation of threatened species,
- support for restoration programmes through research into propagation and cultivation of threatened species
- public and academic education through the establishment of verified collections of native plants

The following are achievements that support the longer term goal:

- Construction of simple but effective propagating and growing on structures
- The installation of a database for managing the living collections
- Establishment of reference collections of threatened plants, particularly those that are hard to identify e.g. many species of the Myrtaceae
- Publication of protocols for the propagation of threatened Chilean plants
- An expansion of the representation of the Chilean flora including plants from Juan Fernandez
- Evaluation of existing collections for their potential use as in restoration programmes and other conservation values
- The running of propagation workshops
- Open days for the public
- Improvements to the interpretative signs within the arboretum

- Increased recognition of the value and potential of the arboretum within UACh, the local community, regionally, and internationally
- Stronger links with other Chilean botanic gardens such as the Jardin Botanico National (Vina del Mar), Chagual Botanic Garden (Santiago) (see also Appendix XVIII)
- A higher profile within the conservation community within Chile
- Improved links with international botanic gardens such as Benmore Botanic Garden (Scotland), the Eden Project (Cornwall)
- Publication of articles in international journals e.g. *Sibbaldia* (RBGE)

Further information about the activities of the arboretum can be found in Appendices XVIII, XIX and XX).

During the third year of the project UACh undertook a review of all of its activities as a result of financial pressures and falling student numbers. One of the results of this review was the redundancy of three of the arboretum staff although they have been partly replaced with students from within the university and volunteers from a local school. The curator has since developed a training programme for them. These students are paid by the university. Some plans for the development of the landscapes within the arboretum have been delayed as a result. The arboretum remains a valued part of UACh but will be the subject of financial constraints for the foreseeable future. The RBGE will continue to provide as much support as possible (See Appendix XX)

4.1.8 Land Owner Agreements and Protected Sites

The network of sites covers 10 sites with populations of six threatened species. These are managed through agreements with six different organisations. Table XX summarises the current status of each site. Copies of the agreements and a map showing the location of the sites were included in the Year 2 report. During the third year, the project was invited to apply to the Bromley Trust following a public lecture given by the UK project leader that covered the work of the project. The project has obtained additional funding (£30k; £10k p.a.) that will be used to support the network over the next 3 years.

SITE NO.	SITE NAME	OWNER	MAIN VALUE	CURRENT STATUS AND FUTURE WORK
1	El Lleuque Angol (IX Region)	Sr. Cifuentes (private)	The only known population of *Prumnopitys andina* in the Coastal Cordillera	Agreement signed; owner involved in management and restoration training; areas fenced; reinforcement plantings started. Floristic surveys carried out. Signposts erected; progress of restoration to be monitored; surveys of surrounding areas planned
2	Bulnes (VIII Region)	Sr. Brevis (private)	One of only 8 known populations of *Beilschmeidia berteroana*	Agreement signed; owner involved in management and restoration training; reinforcement plantings started. Progress of restoration to be monitored
3	Hosteria El Bosque, Victoria (IX Region	Sr. Hernández (private)	One of only 10 known populations of *Myrceugenia colchaguensis*; the only population with any form of protection.	Agreement signed; owner involved in management and restoration training. Trees labelled; propagation in progress. Project publicity material is being disseminated (see Note 1)
4	Tomé (VIII Region)	Sr. Stück (private)	One of the most northern locations for *Pitavia punctata*	Agreement signed. Owner involved in management and restoration training Restoration work initiated.. Regular visits by project staff continuing.

5 - 8	Pitrufquén and Los Barros (IX Region)	F. Mininco	Eastern Cordillera populations of *P. punctata*	Forestal Agreement signed covering various sites up to 12 ha. Site fenced, firebreaks created. Restoration work initiated. Mininco staff responsible for maintenance and monitoring. Regular visits by project staff continuing
9-10	Quebrada Honda 1 and 2, near the towns of Pénco and Tome (VIII Region)	F. BioBio	*P. punctata and Gomortega keule*	Forestal Agreement signed covering various. Site fenced; restoration work initiated. Bio Bio staff responsible for maintenance and monitoring. Regular visits by project staff continuing.

Note 1: The protected site at Victoria is located within the grounds of one of the most popular restaurants along the Ruta 5, (the Chilean section of the Pan American Highway). Leaflets explaining the work of the project have been designed and are included with the menus. (see Appendix XIV and)

Table 1: Protected Site Status. An overview of the work with local landowners was presented by Carlos Zamorano at an international conference in Zaragoza in Spain in September 2005. A copy of the presentation is included as Appendix XXI

4.2 Training

During the project, training was undertaken in both the UK and in Chile. Training at the RBGE focussed on horticulture, collection management and genetic research. In Chile training was more varied and included 'on the job' field training in identification, survey and collecting techniques in parallel with workshops and seminars on propagation and living collection management, threatened species identification and conservation assessments.

4.2.1 UK training

UK training focussed on the 3 Darwin Postgraduate Scholars.

Year 1 – general horticulture, conservation collection management
Year 2 – genetic research – *Pitavia punctata*
Year 3 – genetic Research – *Prumnopitys andina* (externally funded)

Each 6 month placement was advertised within UACh and associated universities. Shortlisted individuals were interviewed by senior Chilean project staff in conjunction with neutral UACh managers. Candidates were selected on the basis of their qualifications, previous experience (especially for the placements involving genetic research), English skills and their interests in conservation within Chile. An example of the advertisement is included as Appendix XI. A scoring sheet used to rate the candidates is included as Appendix XII.

<u>Year 1: July – October 2002. Sr Gonzalo Medel</u>

Gonzalo's training focussed on living collection management and ex-situ conservation, including practical training in propagation and nursery management. Supervision was provided by RBGE staff from the Horticulture division (P Baxter and P Brownless). His schedule included two weeks at Highrove Gardens with His Royal Highness, Prince Charles, two weeks at Benmore Botanic Garden assisting with the development of a major new display of Chilean plants and a presentation to RBGE staff concerning his work on the development of Chilean native plants for commercial and agricultural use. Following his return to Chile, he was employed within the University's arboretum developing the living collections and other aspects of the project's work under the supervision of one of the Chilean members of the project (P. Hechenleitner). He was also involved in the establishment and expansion of the Nasampulli Reserve. Gonzalo has continued to develop his interests in the sustainable use of native plants and, in partnership with his father, has

started to produce *Gevuina* oil commercially (see Appendix XXIX). He has recently been offered a PhD position within UACh.

Year 2: April – October 2003; Sr Darian Stark

Darian's training and work concentrated on the conservation genetics of *Pitavia punctata*, one of the project's key species. Prior to his arrival at the RBGE, he was involved in some of the field work on this species in Chile. He was directly supervised by Dr M Hollingsworth, manager of the RBGE's molecular biology laboratory with an input from Dr P Hollingsworth, the head of the RBGE's Conservation and Population Genetics Section. The results of his work are being prepared for publication. Key findings, presented at the final workshop (See Appendix XVI – presentations Stark) indicate that the most variable and distinctive population is located outside of the official protected area network. As a result of this, a protection agreement with the landowners (Forestal Mininco) was made. Darian's achievements during his Darwin funded training led to his acceptance on the RBGE/ University of Edinburgh MSc in Biodiversity and Taxonomy. Funding (ca £16 000) was raised from within the RBGE. After completing his MSc Darian returned to Chile and was instrumental in organising a workshop on genetics and conservation at the end of the project. He has also been undertaking field work on various species of the conifer family Podocarpaceae in other countries in South America as part of the follow up to his thesis. Four scientific papers on the taxonomy and conservation status of Caribbean *Podocarpus* species (the subject of his MSc thesis) are being prepared for publication. He is currently seeking funding for a PhD.

Year 3: September 2004 – March 2005; Sr Camilla Martinez

Camilla's training and work concentrated on the conservation genetics of *Prumnopitys andina*, another of the project's key species. Camilla played a significant role in the field work of the second year during which the majority of the samples needed for her work were collected. She was also involved in the first year's field work and spent some time at Bariloche in Argentina undertaking genetic analysis of the monotypic genus *Legrandia*. This work was undertaken in collaboration with the BIOCORES project. At the RBGE, her supervision and training were done under the same arrangements as for Darian. The quality of her work has been such that senior RBGE staff have supported a successful application to the University of Edinburgh's Darwin trust for a PhD. She is due to return to the RBGE in September 2005. Results from the genetic research on *Prumnopitys* are still being collated (See Appendix XXII for overview).

4.2.2 Training in Chile

This included 'on the job' field training in identification of threatened species, survey and collecting techniques during field work with UK staff, paralleled by workshops and seminars on propagation (Appendix XXIII) and living collection management, threatened species identification and conservation assessments. The final project seminar included a training sessions on the use of IUCN categories using data collected during the project (presentation by P Thomas in Appendix XVI). In addition to this, one of the Darwin Postgraduate Scholars (Sr Darian Stark) presented the results obtained during his training placement at the RBGE on the conservation genetics of *Pitavia punctata.* In March 2005, the project organised an additional workshop in Valdivia entitled '*The use of genetics in conservation biology'.* This was run over a period of three days (See Appendix XVII)

4.3 Trainee Selection, training content, assessment and accreditation

Trainees involved in field training came from a range of organisations and sources (see Tables 1 and 2 for a list of trainees, roles, training impacts and outcomes) They have included protected area staff, forestry company employees, private landowners and project

staff. In each area/locality that the project worked, the local contacts/people accompanied the project team and received some training. Where possible, these people were also involved in the workshop and seminars that were either held at UACh or in locations selected by participants.

The main aim of the field training was to improve people's identification skills, to broaden their knowledge of threatened species, demonstrate collecting techniques for herbarium specimens. Field training consisted of actually doing the work in the company alongside the UK staff and senior Chilean staff. This proved to be a useful approach e.g. Diego Alarcon from Forestal Arauco discovered several new locations for species such as *Myrceugenia pinifolia, Ribes integrifolia* and *Berberis negeriana* after participating in field work in known locations.

Chilean project staff also organised a series of seminars and workshops on the identification cultivation and conservation status of Chilean native plants. These are detailed in the Annual reports for Year 1 and 2. The value of these workshops has become evident through the location of small populations of species such as *Pitavia punctata* by staff from Forestal Mininco (supervised by Anita Smulders, a key collaborator for the project) after attending one of the workshops. Additionally, Mininco staff were able to accurately identify trees in the Coastal Cordillera which had been mistakenly identified as *Prumnopitys andina* - photographic proof was given to Chilean project staff for verification of the re-identification. This not only saved the project valuable time and money but also proved the value of the training.

The final seminar in November 2004 included a group workshop on the use of the IUCN categories using data collected during the project. This was a popular workshop as there are relatively few people in Chile with experience in using these categories and criteria. Subsequently, a small group of project staff and collaborators was formed to complete the conservation assessments of the species profiled in the manual. These assessments are included as Appendix XV. Presentations and related materials from the final project seminar are included as Appendix XVI.

In March 2005, following requests from Chilean project staff and their colleagues at other institutions in Chile, an additional seminar covering the value and use of genetics in conservation was organised. This involved Dr Hollingsworth (RBGE) and Dr Ennos (University of Edinburgh) as well as the Darwin Post Graduate Scholars, Sr D. Stark and Srta C. Martinez. An outline of the workshop and the topics covered is included as Appendix XVII.

In the review of the second annual report, the reviewer made the following comment

The possibility of a seminar on conservation genetics in the third year is discussed in relation to project progress. Conservation of adaptive genetic diversity is a very important issue, and certainly should not be overlooked in any programme dealing with the conservation of endangered species, particularly when populations are small. However, on a note of caution, I would urge the project leaders to ensure that a future workshop gives detailed attention to what can be achieved without recourse to genetic analysis. Further, that presentations dealing with molecular genetic techniques clearly elucidate the levels of expertise required for this kind of work, and the support which is needed in undertaking a meaningful research programme, both in terms of back-up expertise, local laboratory facilities and funding. The report does note that the establishment of a molecular laboratory in the Chilean University could be a project for the future. Given the extent of the biological, social and economic problems in the region, I feel that the project leaders should not lose focus of the main priorities

As the project has invested a considerable amount of time and energy into training and field work we think that the reviewer's concerns need to be addressed. Dr Peter Hollingsworth has written the following reply on behalf of the project:

The point made by the reviewer is one we completely agree with and from the outset was our intention. The aim of the workshop was to explain what conservation genetics encompasses and involves, and to provide guidelines on when genetic approaches are likely to be useful or not. We wanted to breakdown terminology barriers to allow people to access the literature, so that people with no plans to do genetic work, could still benefit from studies published by others. In the workshop, we were very clear about situations where carrying out molecular genetics research was unnecessary and likely to be an expensive diversion from the question in hand. The workshop also included how surrogate information could be used to assess likely risk of genetic problems in the absence of data on a given species. The workshop finished by summarising (1) When is genetics useful in conservation, (2) When is genetics not useful in conservation.

The workshop served to strengthen links between the laboratory of Andrea Premoli in Bariloche and UACh, and the workshop team have also since helped another group in Chile with submission of a research grant on Leucocoryne (Levi Mansur; Pontificia Universidad Católica de Valparaíso). This interaction among institutes makes good use of existing facilities and helps share expertise. With regards to establishing laboratories at UACh in the future, then of course this would have to be determined based on scientific and conservation need and resource availability. We wish to make very clear that the focus of our conservation work in Chile is not conservation genetics. What we have aimed to do, is to illustrate that there are times that genetic issues can be important in conservation, and to provide advice and training on when this might be, and in these cases, what the most appropriate and cost effective way of dealing with this is.

5. Project Impacts

The project purpose was to provide Chilean researchers and local land-owners with the knowledge and skills to enable them to protect populations of threatened forest species not included in Chile's network of protected areas, by integrating ex-situ with in-situ conservation, in line with the objectives of the national native forest conservation and management policy. A key part of this has been the provision of training in the identification of those threatened species, the establishment of the locations of the remaining populations, research into the conservation status and genetic diversity of selected species and the negotiation of agreements and partnerships between private landowners whose land contains threatened species and conservation organisations. The project has trained a significant number of people and established a number of agreements for the protection and conservation of threatened species. It has also enhanced the capacity of a major arboretum for ex-situ work to enable the integration of in-situ and ex-situ work. It has produced and disseminated a comprehensive manual that covers identification, conservation and propagation of threatened species that will be invaluable to a wide range of people and organisations, beyond those that have been directly involved in the project.

The people who have been involved in the project, either as trainees or as project staff continue to be involved in this type of conservation work. In many cases, training received during the project is leading to further qualifications. Details of trainee and staff outcomes are presented in Tables 2-7. This is compelling evidence of the projects effect on increasing capacity for biodiversity work.

Project Leaders and key project personnel				
Name & Organisation	**Position/ Role in project**	**Training Received During Project**	**Indication of Impact of Training**	**Current Status**
Antonio Lara, UACh	Leader, main negotiator with INIA for BSA			Professor; P.I. FORECOS project
Cristian Echeverria; UACh	Co-Leader	Conservation Assessments; use of IUCN categories	Co-author of 18 conservation status assessments and manual	Post-PhD; FORECOS Project
Paulina Hechenleitner; UACh	Field Coordinator/ Trainer/ Trainee	Identification; collecting techniques; population surveys; Conservation Assessments; use of IUCN categories; Living Collection management; database management	Co-author of 46 conservation status assessments and manual; Successful establishment of threatened species collection at UACh; recipient of RBGE Honorary Conservation Associate Award; accepted as MSc student in UK starting 2006	Arboretum Curator; University Lecturerr; Honorary Conservation Associate (RBGE); MSc student 2006
Bernardo Escobar; UACh	Propagation advisor / Trainer			Propagation advisor/ consultant
Carlos Le Quesne; UACh/CONAF	Main contact with CONAF	Conservation Assessments; use of IUCN categories	Co-author of 4 conservation status assessments and contributor to manual	Professor, UACh

Table 2: Details of training received, training impact and current status for project staff from UACh

Main Trainees/students				
Name & Organisation	**Position/ Role in project**	**Training Received During Project**	**Indication of Impact of Training**	**Current Status**
Gonzalo Medel; UACh	Trainee/Darwin Scholar	Living Collection management; database management; protected area establishment and management	Accepted for PhD focussing on sustainable use of Chilean native plants.	PhD student (main interest sustainable exploitation of Chilean native plants e.g. *Gevuina avellana*)
Darian Stark; UACh	Trainee/Darwin Scholar/ MSc student	Conservation genetics; collecting and surveying techniques; taxonomy	Papers on conservation genetics of key threatened species in prep	Researcher/ Ph D applicant
Camilla Martinez; UACh	Trainee/Darwin Scholar	Conservation genetics; Conservation assessments; collecting and surveying techniques; taxonomy; Living Collection management; database management	Papers on conservation genetics of key threatened species in prep . Accepted for PhD student ship	PhD student starting September 2005 (RBGE/UACh)
Carlos Zamorano ; UACh	Trainee/Project Assistant	Identification; collecting techniques; population surveys; Conservation Assessments; use of IUCN categories; protected area establishment and management; database management BG-Base Mexico	MSc student 2006/7, ECOSUR, Mexico	MSc student 2006/7, ECOSUR, Mexico

Fernando Bustos UACh	Trainee/Project Assistant	Identification; collecting techniques; population surveys; Conservation Assessments; Living Collection management; database management	Contributor to species accounts; now employed as Project Assistant for FORECOS Project (Principal Investigator - A Lara)	Project Assistant BIOCORES and FORECOS Project
Daniela Weber; UACh	Project Assistant	Living Collection management; database management; benefit sharing agreement	Training still in progress (Darwin Scholar May 2005-March 2006)	Darwin Scholar May 2005-March 2006
Luis Soto; UACh Arboretum supervisor	Project Assistant/ Trainer	Living Collection management; database management	Successful establishment of conservation collections within arboretum	(Retired)
Bernardo Araneda; UACh Arboretum	Project Assistant	Living Collection management; database management	Successful establishment of conservation collections within arboretum	Arboretum staff; Arboretum New Supervisor
Claudio Muñoz; UACh Arboretum	Project Assistant	Living Collection management	Successful establishment of conservation collections within arboretum	(Retired)
Oscar Salazar; UACh Arboretum	Project Assistant			(Retired)
Hugo Mancilla; UACh Student	Trainee	Living Collection management	Successful establishment of conservation collections within arboretum	Forest Enginer student
José Luis Palma; UACh Student	Trainee	Living Collection management	Successful establishment of conservation collections within arboretum	Forest Enginer student
Pilar Carcamo, UACh	Student trainee	Living Collection management; propagation training	Successful establishment of conservation collections within arboretum	Arboretum assistant
Mabel Delgado, UACh	Student trainee	Living Collection management; propagation training	Successful establishment of conservation collections within arboretum	Arboretum assistant

Table 3: Details of training received, training impact and current status for trainees and students from UACh

Private Landowners				
Name & Organisation	**Position/ Role in project**	**Training Received During Project**	**Indication of Impact of Training**	**Current Status**
Sr. Cifuentes; Angol	Private landowner/ trainee	Threatened species identification; propagation; protected area establishment and management	Participation in conservation agreements for threatened species	Conservation partner (*Prumnopitys andina*)
Sr. Brevis; Bulnes	Private landowner/ trainee	Threatened species identification; propagation; protected area establishment and management	Participation in conservation agreements for threatened species	Conservation partner (*Beilschmiedia berteroana*)
Sr. Hernández; Victoria	Private landowner/ trainee	Threatened species identification; propagation; protected area establishment and management	Participation in conservation agreements for threatened species	Conservation partner (Various species)

Sr. Stück; Tomé,	Private landowner/ trainee	Threatened species identification; propagation; protected area establishment and management	Participation in conservation agreements for threatened species	Conservation partner (*Pitavia punctata*)

Table 4: Details of training received, training impact and current status for private landowners

Private Forestry Companies (Forestales)				
Name & Organisation	**Position/ Role in project**	**Training Received During Project**	**Indication of Impact of Training**	**Current Status**
Anita Smülders; F. Mininco	Collaborator/ Trainee	Threatened species identification; protected area establishment and management; conservation status assessment	Establishment of reserves for threatened species on Forestal Land; discovery of new localities	Biodiversity Officer, Forestal Arauco
Diego Alarcón; F. Arauco	Collaborator/ Trainee	Threatened species identification; protected area establishment and management; conservation status assessment	Establishment of reserves for threatened species on Forestal Land; discovery of new localities	Biodiversity Officer, Forestal Arauco
Germán Schaub; Bio-Bio	Collaborator/ Trainee	Threatened species identification; protected area establishment and management	Establishment of reserves for threatened species on Forestal Land	Supervisor, Forestal Bio Bio

Table 5: Details of training received, training impact and current status for collaborators and trainees from Private Forestry Companies (Forestales)

CONAF (Guardaparques)				
Name & Organisation	**Position/ Role in project**	**Training Received During Project**	**Indication of Impact of Training**	**Current Status**
Ivan Benoit; CONAF	Collaborator/ Advisor			Senior CONAF Administration (Dept of Wild Patrimony
Cristian Alegría; (R.N. Los Bellotos del Melado)	Field Trainee/ collaborator	Threatened species identification; field collecting techniques	Continued exchange of information about localities and status of threatened species within their area	Guardaparque
Fernando Campos; (P.N. Los Queules)	Field Trainee/ collaborator	Threatened species identification; field collecting techniques	Continued exchange of information about localities and status of threatened species within their area	Guardaparque
Pedro Jara; (P.N. Los Ruiles)	Field Trainee/ collaborator	Threatened species identification; field collecting techniques	Continued exchange of information about localities and status of threatened species within their area	Guardaparque
Segundo Oliva; (P.N. Nahuelbuta)	Field Trainee/ collaborator	Threatened species identification; field collecting techniques	Continued exchange of information about localities and status of threatened species within their area	Guardaparque

Table 6: Details of training received, training impact and current status for collaborators and trainees from CONAF

Botanic Gardens (UK and Chile)				
Name & Organisation	**Position/ Role in project**	**Training Received During Project**	**Indication of Impact of Training**	**Current Status**

Adrian Lovat; Eden Project	Collaborator/ Field Trainee	Threatened species identification; field collecting techniques	Improved curation of Chilean collection at Eden Project	Assistant Curator Temperate collections
Helen Urra; P. Pedro del Río Zañartu	Collaborator			Journalist
Antonia Echenique; J.B. Chagual	Collaborator/ Field Trainee	Threatened species identification; field collecting techniques; conservation status assessment; use of IUCN categories; living Collection management	Policies for establishment of ative plant collections at Chagual	Executive Director, Jardín Botánico Chagual
María Victoria Legassa; J.B. Chagual	Collaborator, dissemination activities			Editor, Jardín Botánico Chagual Magazine
Catherine Kenrick; J.B. Chagual	Collaborator			Jardín Botánico Chagual
Patricio Novoa; J.B. Nacional	Collaborator	Conservation status assessment; use of IUCN categories	Co author of species accounts and 12 IUCN assessments	Curator, Jardín Botánico Nacional

Table 7: Details of training received, training impact and current status for collaborators and trainees from Botanic Gardens (UK and Chile)

The achievements of the project have also contributed to Chile's capacity to meet its obligations under the CBD; the specific articles that it has been relevant to are detailed in Appendix 1. More specifically, the project has contributed to the goals and targets of the Global Plant Strategy for Plant Conservation; these contributions are detailed in Table 8

GPSPC ARTICLE/ TARGET	**CONTRIBUTION**
(2) A preliminary assessment of the conservation status of all known plant species, at national, regional and international levels	46 species assessed using the IUCN 2001 categories for the first time. Xx species have been assessed for the first time
(3) Development of models with protocols for plant conservation and sustainable use, based on research and practical experience	Protocols for plant conservation and sustainable use are being established as part of the agreements with private landowners. This work is ongoing.
(5) Protection of 50 % of the most important areas for plant diversity assured	The project has focussed on key threatened species in an area that is recognised as biodiversity hotspot and has initiated the establishment of additional protected areas in areas where threatened species occur
(7) 60 % of the world's threatened species conserved *in situ*	See above
(8) 60 % of threatened plant species in accessible *ex situ* collections, preferably in the country of origin, and 10 % of them included in recovery and restoration programmes	Initial ex-situ collections have been established for 10 critically endangered species; Preliminary propagation protocols have been published for the first time
(13) The decline of plant resources, and associated indigenous and local knowledge, innovations and practices that support sustainable livelihoods, local food security and health care, halted	Several of the species targeted have significant indigenous knowledge and use values e.g. *Berberidopsis corallina, Pitavia punctata, Prumnopitys andina*. Ensuring their conservation helps to maintain these values.
(14) The importance of plant diversity and the need for its conservation incorporated into communication, educational and public awareness programmes	The project has published and is disseminating widely *Plantas Amenazadas del Centro-Sur de Chile,* the first publication dealing with threatened woody species from this biodiversity hotspot

(15) The number of trained people working with appropriate facilities in plant conservation increased, according to national needs, to achieve the targets of this Strategy	The project has provided training in conservation methodologies to more than 30 people. A significant proportion of these people have previously been involved in forestry activities detrimental to plant conservation.
(16) Networks for plant conservation activities established or strengthened at national, regional and international levels	Informal networks between existing (UACh, Jardín Botánico Nacional) and new botanic gardens (Jardín Botánico Chagual) within Chile have been established. Conservation partnerships including forestry companies, private landowners and conservation organisations have been promoted.

Table 8: The contribution by this project to Chile's obligations under the relevant targets of the GPSPC

5.1 Collaboration between Main partners

UACh and the RBGE have had strong links for a number of years and there is a formal MoU between the organisations and this project has strongly reinforced their collaboration. Ms Paulina Hechenleitner, the project's field coordinator has recently become an Honorary Conservation Associate of the RBGE in recognition of her outstanding work on this Darwin Initiative. The project has also provided opportunities for each organisation to expand their contacts and collaboration within the UK and in Chile. Staff from the University of Edinburgh have been closely involved in the development of the genetic research; Dr Richard Ennos took part in a seminar at UACh in March 2005. He is also involved in the supervision Camilla Martinez's PhD. Professor Antonio Lara is a co-supevisor. This link has also been extended to include the molecular research team in Bariloche, Argentina. From the RBGE's view, the project has served to increase the links with important taxonomic institutions such as the herbarium at the University of Concepcion which is responsible for publishing the Flora of Chile. There are also improved links with other conservation organisations such as CONAF. The implementation of the Benefit Sharing Agreement will ensure continued collaboration between RBGE, UACh and INIA.

5.2 Project Impact on local collaboration

UACh is one of the leading centers in Chile for research on the ecology and conservation of native forests. Over many years they have successfully collaborated with a range of both international and national institutions on a wide variety of projects. This project has had a number of influences on their collaboration. The negotiations for the benefit sharing agreement have increased and broadened their contact with organisations such as INIA and CONAMA who are responsible for CBD implementation and compliance. The capacity building within UACh's arboretum has increased contact with other botanic gardens in Chile such as Jardin Botanico Nacional and the newly established Jardin Botanico Chagual, Santiago. It has also improved contact with the local community through the enhancement of the arboretum and the running of training courses and open days for the public. The wide geographic range of the project has also meant improved contact with regional organisations as far away as Region IV. The botanical and taxonomic elements of the project have led to the development of better links with botanists and taxonomists in the major national herbaria in Concepcion and Santiago. The development of agreements with forestry companies such as Mininco and Bio Bio represent a different type of relationship than those already established. Additionally, the agreements and practical work with the small landowners has increased the university's contact with one of the most important groups of native forest owners. Overall, the project has had a good influence on local collaboration.

5.3 Social Impact

In Chile, the utilisation of native forests has been a very controversial subject for several

decades. The conversion to exotic plantations of large areas of native forest in biodiversity hotspots such as the Coastal Cordillera of Region VII and VIII has created many conflicts involving indigenous people, conservationists, private companies and governments. The overall result of deforestation has been the severe fragmentation of native forests. The remaining fragments are either owned by the timber companies or are on the properties of small landowners. In both cases the fragments tend to be surrounded by larger areas of exotic plantation.

Consumer pressure resulting from adverse publicity has combined with a growing understanding of the value of native forest ecosystems to create strong pressures on private companies for certification of forest products and protection and sustainable management of the remaining fragments of native forest. In this context, many of these companies have been placed in a position where they have to at least be seen to be protecting native forests and particularly threatened species. However, most lack the necessary staff and skills to undertake this work. This situation has created new opportunities for collaboration between those companies, other landowners and conservation organisations as well as a demand for training.

The project's initial focus was on working with the small landowners with remnants of native forest. However, it was soon realised that the long term future of these areas was closely linked to the activities of the surrounding landowners which, in many cases were the commercial timber companies. For this reason, the project's focus was broadened to include working with the companies, especially with Forestal Mininco. The agreement with Mininco was used as a model by another UK funded project for collaborative working on the restoration of Araucaria araucana at Villa Los Araucarias in which the forestry company, the local community and the conservation organisation ar now working together. There is still a lot of mutual distrust between conservation organisations, small landowners and forestry companies in Chile that hampers conservation work but this project has made a good start in breaking down those barriers.

6. Project Outputs

Please see Appendix II for project outputs, an explanation of differences in proposed outputs and achieved outputs as well as descriptions of additional outputs.

6.1 Publications

Full details of all publications can be found in Appendix III

6.2 Dissemination

Information regarding the progress of the project and the outputs were disseminated through a range of outlets and aimed a variety of audiences. Articles have been published in national papers in Chile and the UK, specialist journals and newsletters, interviews given on radio in both Chile and the UK. Seminars specifically related to the project were organised within Chile and presentations made at other conferences in Chile and also at international venues e.g. in September Carlos Zamorano made a presentation to the Ecological Restoration: A Global Challenge Conference held in Zaragoza, Spain. His presentation covered the work of the project with local landowners as well as the work covered by other project's such as BIOCORES (see Appendix XXI). Dissemination outputs are listed in Appendix III. Copies are also included either in hard copy or as electronic versions.

The major output suitable for wide dissemination has been the book on threatened plants. This has already been freely distributed to all people (private and professional) and organisations (Government, commercial and NGOs) directly involved in the project as well as all CONAF regional and central offices. Copies have also been sent to contacts in

surrounding countries such as the Argentinean coordinator of the South American temperate Species Group. All National Parks and Reserves will receive a copy.
The main target audience for the manual are forestry companies, students and lecturers in universities, NGOs (e.g. CONAMA, CODEFF, WWF other Chilean conservation NGOs), potential or existing funders (e.g. Anglo Chilean Society, Anglo American Mining Co)
A limited number of copies will be sent to the UK for distribution by the UK staff. Plans are being made for a limited English edition if extra funding can be raised; we estimate that it would cost an additional £2k - £4k. The main purpose for this would be to support fundraising activities in the UK. There are also plans for a web-based version to be included in a redeveloped website hosted by the RBGE. This is unlikely to happen before March 2006.

It is likely that a second edition will be produced within the next 3-5 years although it may be incorporated into a completely revised list of all threatened plants in Chile that is being discussed within Chile.

7. Project Expenditure

	ORIGINAL BUDGET	AGREED REVISED BUDGET	ACTUAL 2002/3	ACTUAL 2003/4	ACTUAL 2004/5	ACTUAL TOTAL	DIFFERENCE COL2 - COL6	% DIFF

*The Printing work was completed in Chile and was more expensive than had originally been envisaged. A higher quality coloured format was chosen, which also added to the cost

Table 9: Project Expenditure

8. Project Operation and Partnerships

8.1 Partnerships

Over the three years, the project worked with a wide range of partners at an informal individual level and on a more official level. The purpose and objectives along with the nature of the actual work meant that this was inevitable. In some cases, the initial contact was more by luck e.g. during the first year when the project was searching for a rumoured location of the conifer *Prumnopitys andina*, the project team entered a property to request directions. It happened that this was the actual place where the trees were located. This property, owned by Sr Domingo Cifuentes, became one of the projects key sites. At the outset of the project, it was expected that we would come into contact with quite a wide range of organisations and people. At the end of the project, the actual number became evident when the acknowledgements for the threatened plants manual were compiled (see Appendix VII, pages 13-16 and Appendix VIII, pages 6-9). These acknowledgements relate to one of the main outputs of the project and do not include all those people and organisations in both Chile and the UK who contributed to other project activities such as the Benefit Sharing Agreements and those who supported and contributed to the training of the Darwin Post Graduate Scholars.

For the purposes of this report a summary of the main individuals and organisations, their role during the project is given in Table 10.

CHILEAN CENTRAL AND REGIONAL GOVERNMENT DEPARTMENT LOCAL PARTNERS/ COLLABORATORS		
Name/ remit	**People**	**Project Role**
CONAF; protected area administration	Various people	Access to protected areas; information on threatened species, contacts with local landowners
INIA; access to genetic resources	Tea García-Huidobro; Pedro Leon	Benefit Sharing Agreement
Chilean NGOs/ Projects		
Name/ remit	**People**	**Project Role**

BIOCORES; restoration of fragmented landscapes	Various	Collaboration on restoration work, protected areas, genetic research on *Legrandia*
FONDEF; protection of native species	Various	Restoration work, protected areas
FORECOS; ecosystem services	Various	Publications
ODEPA (Oficina de Estudios y Politicas Agrarias)	Teresa Aguero	Benefit Sharing Agreement
CONAMA; Environmental issues	Patricio Olivares	threatened species consultant; Benefit Sharing Agreement
Chilean National Institutes/ Universities		
Name/ remit	**People**	**Project Role**
UACh; key centre for research on native forests	Claudio Donoso, Carlos Ramírez	Threatened species consultant
Universidad de Chile; key centre for research on native forests	Ramiro Bustamante, Maria Teresa Serra	Threatened species consultant
Universidad de Concepción; Flora of Chile	Clodomiro Maticorena, Roberto Rodríguez	Taxonomic consultant; Threatened species consultant; Access to private lands
Museo Nacional de Historia Natural, Santiago; Flora of Chile	Mélica Muñoz	Taxonomic consultant; Threatened species consultant
Jardín Botánico Nacional, Viña del Mar; Flora of Chile	Patricio Novoa	Threatened species consultant; Access to private lands
Universidad Católica del Maule; key centre for research on native forests Region VII	Rómulo Santelices	Threatened species consultant
Universidad de La Serena; key centre for research on native species Region IV	Francisco A. Squeo	Threatened species consultant
Universidad Católica de Temuco; key centre for research on native forests	Marco Cortéz	Restoration of threatened species
Commercial Companies		
Name/ remit	**People**	**Project Role**
Forestal Arauco; significant owner of remnant native forests	Diego Alarcón, Bioforest S.A. Concepción	Access to private lands; threatened species consultant
Forestal Mininco; significant owner of remnant native forests	Anita Smulders	Access to private lands; threatened species consultant; publications
Forestal Bio-Bio; significant owner of remnant native forests	Germán Schaub	Access to private lands
Mina El Soldado	Alex Ossa	Access to private lands
UK/ International Organisations and NGOs		
Name/ remit	**People**	**Project Role**
Universidad Nacional del Comahue, Bariloche, Argentina; genetics of South American species	Andrea Premoli	Genetics, training for Darwin scholars
Arizona State University, USA; taxonomic research on Myrtaceae	Leslie Landrum	Taxonomic consultant
Institut Fur Systematische Botanik (MSB), München, Germany; taxonomic research on Calceolaria	Christine Ehrhart	Taxonomic consultant
RBG Kew	Barbara Mackinder	Taxonomic consultant

Eden Project	Sue Minter; Adrian Lovat	Financial support; publicity
Royal Horticultural Society	Various	Financial support; Benefit Sharing Agreement; publicity
Dobbies Nurseries	Neil Cummings	Benefit Sharing Agreement
Benmore Botanic Garden	Trustees	Financial support
University of Edinburgh	Richard Ennos	Genetics, training for Darwin scholars
Rainforest Concern	Various	Publicity for project activities
Royal Geographic Society	various	Publicity for project activities
Liss Forest Nurseries	Peter Catt	Financial support; Benefit Sharing Agreement

Table 10: Summary of main individuals and organisations and their role during the project

8.2 Partner Involvement in Project Planning and Implementation

Chilean staff have been closely involved in the planning and implementation of the project since its inception. Field work, especially access to private land was reliant on the network of personal contacts at the outset of the project and those gained during the project. The smooth running of the field work throughout the three years was a tribute to the good personal relations that our Chilean counterparts already had with a range of organisations and to the sensitiveness with which they developed new contacts during the project.
The project's plans, and the overall focus of the project expanded towards the end of first year in response to increasing contact with forestry companies. As a result, the project did not contact as many small landowners as it could have. This aspect is discussed further in the section on social impacts.

Plans for each year's work were always discussed during the visits by the UK staff. Additionally, email contact was prolific and telephone calls frequent, especially during the production and editing of the threatened plants manual. UACh make good use of modern internet technology such as video linking and instant chat for project planning and coordination of activities. The RBGE is not as advanced in this respect; UK staff have discussed this with IT staff; it is hoped that this situation will change in the future.

8.3 Collaboration with other Darwin projects

Two other Darwin projects were active during the time of this project. The first, '*Conserving the critically endangered Darwin's fox on Chiloé Island, Chile'* (Ref. 11013) was based in a different part of Chile and there was very little contact with this project. The second, 'Access to Genetic Resources, Benefit Sharing and Traditional Knowledge in Chile' (Ref. 11011) was more relevant. This project was working with an NGO rather than the official department responsible for genetic resources (INIA). Its main aim was to raise awareness and promote the policy debate on a national framework on access to genetic resources, benefit sharing and traditional knowledge and to attempt to address the lack of legislation on access to genetic resources at national level. In the UK, contact between the two projects was limited to the exchange of project documents, outputs and email discussions. The implementation schedules for both projects meant that UK based staff were not in Chile at the same time. However, several of the Chilean counterparts and participants in the FIELD project were directly involved in the negotiations for the Benefit Sharing Agreement (e.g. Tea García-Huidobro, CONAMA, Pedro Leon, INIA) and made significant contributions. In our opinion, the work of the FIELD project facilitated the Benefit Sharing Agreement, particularly in regard to the benefit sharing arrangements; negotiations may have gone on for much longer without their input in Chile.

8.4 Collaboration with host country Biodiversity Strategy (BS) Office

In addition to the contacts with INIA and CONAMA relating to the CBD and the development of the Benefit Sharing Agreement, the project has had a number of contacts with organisations responsible for various other aspects of Biodiversity Strategies, particularly in Region VII. These mainly occurred in Year 2 and included participation by C Echeverria in the formulation of the Biodiversity Action Plans for Region VII and VIII. Cristian's contribution mainly related to his work on fragmentation of native forests and the importance of corridors within such a landscape. Cristian has also been developing global indicators for fragmentation for the CBD secretariat which are partly based on research in southern and central Chile. UACh and CONAMA (Comisión Nacional del Medio Ambiente, the government agency responsible for the environment) have also signed a long tern agreement under which UACh staff will provide specialist knowledge about threatened plants as well as deforestation and fragmentation processes.

8.5 Post Project Partnerships

Since the official end of the project local partnerships such as those with small landowners and forestry companies have continued and will do so for the foreseeable future. Additional activities are planned; these include further joint surveys for *Valdivia gayana* in collaboration with protected area staff near Valdivia, commissioned threatened species survey work on private land owned by Forestal Tornagaleones and training in identification of threatened species and sustainable management in the Raguintulelfu area of Region IX. Most of this work will be carried out by P Hechenleitner and C Zamorrano with funding from the Bromley Trust and the Catherine Olver Fund.

9. Monitoring and Evaluation, Lesson learning

9.1 Monitoring and Evaluation

Evaluation and planning meetings were held during visits by UK staff to Chile and during visits to the UK by Chilean project leaders. These produced flexible work plans that were implemented as far as possible, changing in the light of new opportunities as they arose. Progress was monitored and planned against the targets within the revised logframe, as suggested by the reviewer. Email and phone contact was maintained throughout the project.

9.2 Training Evaluation

Database training was evaluated by the completion of targets for updating the recording of the living collections within the Arboretum and evidenced by the production of printouts on request from the UK staff during their visits.
Identification of Threatened species: this was carried out as 'on the job training during visits by UK staff. Its effectiveness was evaluated through the discovery and reporting of new localities for threatened plants by trainees; these were evidenced either by the collection of herbarium specimens or photographs.
Living Collection management; again this type of training was largely 'on the job' training and evidenced by the establishment of collections of threatened plants within the arboretum, the construction of appropriate facilities such as the propagation unit, an increase in the number and the development of polices for accessioning material. Propagation training; this is the hardest type of training to evaluate due to the length of time that it takes to implement and gain results from the training. Although it is relatively easy to impart technical knowledge that could be evaluated through simple tests or other tools such as questionnaires, this will not give a clear idea of the effectiveness of the training. A better measure is the establishment

and successful maintenance of difficult to propagate plants within the nursery. By the end of the project all the threatened species described in the manual had been established within the arboretum. Additionally the protocols for thirteen species were compiled and then published for the first time within the manual. These protocols are mainly derived from work carried out by trainees in Chile.

9.3 Baseline Information

A considerable amount of baseline information relating to various areas of the project were was collected; more than 75 localities that were reported to have threatened species were ground-truthed; more than 45 sub-populations of threatened species were surveyed, 15 new localities and sub-populations of 8 threatened species were located, almost 1000 herbarium specimens were collected and 46 species were assessed using IUCN 2001 categories. The most up-to-date and comprehensive manual on the identification and cultivation of threatened species in Chile was produced from this work.

Agreements with private landowners; 4 private landowners were contacted during the project, agreements were negotiated with them and restoration work initiated. Similar agreements were made for six sites owned by forestry companies for the management of threatened species. These were the first such agreements.

9.4 Milestones

The major milestones identified in the project proposal and the degree to which they were achieved, are listed below:

- Establishment of database and conservation collections within UACh arboretum; a powerful database was installed in the first year and collections established in the second year. The database was upgraded in the second year and the living collections continue to expand.
- Training of three Chilean Postgraduate Darwin Scholars (1 per year); this was achieved.
- Habitat management plans in place by mid-term; two had been prepared, others were being negotiated
- Annual visits by UK staff; these were carried out with some variation to the timetable to take account of other commitments by both UK and Chilean staff.
- Signing of agreements for the commercialisation of Chilean native plants: this was originally intended for the end of the second year (April 2004) but was finally signed during an extension to the project granted by the Secretariat in July 2005. The delay was caused by unexpected complications during the negotiations (see Year 3 half year report)
- Submission of papers to peer reviewed journals and final drafts of manuals; the scientific papers are still being prepared, although five other papers have been published. Final drafts for the manual were ready within 2 months of the original deadline.

9.5 Main Problems

The main problems during the project were the initial difficulty in identifying the correct department/organisation with which to negotiate the BSA and the problems associated with designing an equitable benefit sharing scheme within Chile. The other Darwin project on Access and Benefit Sharing provided a useful forum for the main Chilean organisations involved in CBD compliance to discuss these aspects, Additionally the UK leader made additional visits to Chile for meetings on these subjects and Chilean leaders came to the UK to make personal contact with the nursery. Eventually it became clear that INIA was the responsible organisation and a compromise arrangement for benefit sharing was agreed.

This is described in Section 4.1.6.

9.6 Internal and External Evaluation

Within the project, the main evaluation was carried out through reviewing progress towards project milestones, the revised logframe and in response to reviewer's comments.
At the end of Year 2 (April 2004), the project was subject to an external Mid-Term Review. A consultant employed by the Darwin monitors spent a week in Chile reviewing the activities of the project and speaking with Chilean staff and trainees. He produced a very favourable review; the response from the project is detailed in the next section as it was not included in any annual report. It would have been beneficial to the project if the reviewer had also been able to spend time with the UK project team.

9.7 Key Lessons

The key lesson learnt from this project is that the amount of work involved in complying with the letter of the CBD in addition to its spirit should not be underestimated. There are many aspects of benefit sharing and access to genetic resources that may seem simple but are in reality very complicated. Identifying institutional responsibilities and appropriate channels for communication are also time consuming processes. The project was fortunate in that its participants had a very wide range of skills and, perhaps most importantly, personal contacts across many Chilean government departments and organisations and within the UK. It would be interesting to see if there were similar difficulties if the project was trying to commercialise a British native species in Chile.

10.1 Actions taken in response to annual report and Mid Term review

10.1 Year 1 Annual Report Review

The reviewer of the first annual report requested more detailed information regarding the progress of the Benefit Sharing Agreement, particularly in terms of the timeframe for securing the agreement and any problems that the project may be encountering due to lack of expertise in the UK. The Reviewer also made specific requests for changes to the Logcial Framework and for information about a delay in transferring funds to Chile.
All of these questions were answered in some detail in the half year report for the second year along with the requested changes to the Log Frame.

10.2 Mid-term Review – responses to comments and recommendations

Prior to the submission of the second year report, the project was selected for an intensive mid-term review of its activities in Chile. In Section 5 of his report, the reviewer made the following comments and recommendations (summarised):
5.1 ensure adequate attention to dissemination of project achievements and recommendations.
5.2 consider how to develop from the current species focused approach to address conservation issues at a habitat and landscape scale.
5.3 Further articulation with the UK and Chilean institutions involved with the Access to genetic resources, benefit sharing and traditional knowledge in Chile
5.4 consider post project funding applications to continue dissemination of project results, monitoring of small land owner sites and further consolidation of the arboretum is justified.
5.5 finalise Strategic Plan for the arboretum, including a fund raising strategy
5.6 If plans for the Centre for Native Forests go ahead, it is important that this

incorporates a means for external stakeholder review and monitoring
5.7 If funds can de found, a follow up survey to record how project trainees are using the knowledge and skills and whether they have gone on to multiply the effect by training others should be undertaken.

Response
5.1 Several articles covering the work of the project, the threatened plants manual and the BSA have been published in popular magazines, newspapers and newsletters and on radio; project results were disseminated at the final seminar in Chile, a special launch was held for the manual and an additional seminar focussing on the values and problems of genetics in conservation was used to highlight some of the research carried out during the project.
5.2 The project's emphasis has remained species based; however the project team consider that we have provided important data that other projects can use to develop action on conservation issues at habitat and landscape scale. These include the development of agreements that influence companies such as Mininco who own the majority of remnant forests, the dissemination of Cristian Echeverria's work on fragmentation processes and the ground-truthing and surveying of localities for threatened plants
5.3 The Chilean organisations involved in the Darwin project referred to continued to be involved in the negotiations and had a significant input into the final protocols.
5.4 Post project funding; suggestions were put forward in the appropriate section of the second annual report but the project was not invited to apply for post project funding. In the third year, project staff successfully raised additional funding to support two salaries, maintain the network of sites and continue monitoring threatened plant populations
5.5 The overall strategic plan for the arboretum is still under development; part of the current Darwin Scholar's work is to develop policies on access and use of genetic resources in the light of the recently agreed BSA. The development of the arboretum has been somewhat hampered due to the financial uncertainty within the university over the last year and by the considerable amount of other work that has been required during the final year of the project. The Curator is implementing a preliminary fund raising strategy that includes sale of firewood from coppicing activities within the arboretum. UK staff are also seeking further funding for the arboretum. The University is supportive of the arboretum but has very limited financial resources. Income generation is being approached cautiously as it would be very easy to initiate programmes such as the sale of self propagated plants that would divert the limited staff time and resources from its conservation and education work. An additional possibility for fund raising that is being considered may be an agreement with a local nursery to produce plants under licence for sale by the arboretum and the nursery.
5.6 The development of a Centre for Native Plants is still under consideration within UACh and has been approved in principle by the University
5.7 No funds have been found to support a follow up evaluation of the training by the project. At this stage, the continued reporting of new localities for threatened plants and the continued establishment of living collections within the arboretum by ex-trainees is sufficient reassurance that at least the training in identification and propagation were effective. However, the project does recognise that this approach does not help to identify further training needs.

10.3 Year 2 Annual Report Review

The reviewer for the second annual report made several specific requests. These included

1. a request for a copy of Handbook produced for Mininco staff to assist in recognition of threatened species
2. A summary of the work of the Darwin Scholar in the next half yearly report
3. further information regarding the implications of a delayed propagation workshop and the evaluation and monitoring of training
4. further details about the BSA, the selection of horticulturally worthy plants and the

likely income that would ultimately be generated for Chile

Response

1. The Mininco handbook is enclosed with this report; a copy was unavailable in time for the third year half year report (Appendix XIV)
2. A summary of the scholars work was included in the last half year report
3. the implications of a delayed propagation workshop Details of the propagation workshop that was held are included as Appendix XXIII. We do not think that the delay had any particular implications for the project.
4. the evaluation and monitoring of training are discussed in the sections 4.3 and 9 of this report.
5. details about the BSA are also included in Section 4.1.6 of this report

All reviews were discussed with Chilean colleagues; responses and actions were decided jointly.

11. Darwin Identity

All publicity material produced during the project, including signs on protected areas, flyers for seminars and even the inserts for menus at the hosteria El Bosque (one of the protected areas set up by the project), included the Darwin logo. The Darwin Initiative was credited in all publications produced by the project, and mentioned in the majority of the media articles written either by project members or journalists. The Darwin logo was incorporated onto the herbarium specimens that have been lodged in Chilean and UK institutes. The Darwin logo also appears on the main publication *Plantas Amenazadas del Centro-Sur de Chile*. The three students sponsored or supported through the Darwin Project were known as Darwin Postgraduate Scholars. This phrase was used to distinguish them from students supported by the Darwin Scholarship Scheme.

The Darwin Initiative has supported 10 projects in Chile since its inception. There are many people and institutions who are aware of the Initiative, its aims and objectives. The range of individuals and organisations involved in this project, means that even more people are aware of the Initiative.

12. Leverage

During the project, significant additional funding and resources were obtained to assist with activities during the project and to ensure the legacy of the project. These amounts are well beyond those in the original proposal. Table 11 gives details.

SOURCE	AMOUNT (£)	DURATION	PURPOSE
Catherine Olver Trust	200 000	2004 - Ongoing	Ongoing support for training of Chilean postgraduate students in conservation work. This originated from a bequest by a private individual in the UK who had a strong interest in Chilean plants. The capital has been invested and the interest is being used to support training costs on a biannual basis. Two awards have been made to support the costs of two project staff undertaking MSc – one in Mexico (Sr. C Zamorano) and one in the UK (P Hechenleitner). The fund is managed through the RBGE.

Bromley Trust	30 000 (10k p.a.)	2005-2008	Continued support for protected areas established during project and for monitoring threatened species
Royal Horticultural Society	Various amounts Est. 15k	2002-2006	Financial support for costs of Chilean trainees in the UK; contribution to field costs in Years 2 and 3
Private Individuals	Various amounts Est. 10k	2002-2005	Financial support for costs of Chilean trainees in the UK; Costs associated with Genetics Workshop, Valdivia
RBGE	12 000	2004	MSc costs for D. Stark
UK Genetics Society	1 065	2005	Costs associated with Genetics Workshop
Total	268 065		

Table 11: additional funding and resources raised during the project

In addition to fundraising for the activities directly associated with this project, UK and Chilean project staff were also instrumental in raising £140 000 through Rainforest Concern for additional land purchases for a nature reserve in Region IX, Chile.

13. Sustainability and Legacy

There are a number of the project's achievements that will leave a strong legacy both in the short and medium term.

The manual on threatened plants is the most comprehensive work published so far. The information regarding the conservation status, distribution and especially the identification and propagation information should make it an invaluable guide for conservationists and improve the prospects for conservation actions with threatened species in the future. It is also hoped that the involvement of a wide range of people in the actual conservation assessments using the IUCN categories will catalyse the process of producing a revised Red Data Book for all plants within the next 5 years.

The agreements with private landowners, especially those with the forestry companies represent a new way of working between previously opposed organisations. The success of this project has already inspired other projects to create new agreements; one example of this is the recent agreement between Forestal Mininco and the organisations and small landowners involved in the restoration of *Araucaria* forests at Villa Los Araucarias in Region IX. Under this agreement, the adjoining lands owned by Mininco will be included in the conservation management plans that have been developed for areas owned by the local community.

The project's ongoing work with landowners and the monitoring of threatened plant populations has been assured for a least the next three years through the raising of supplementary funding. Work plans for the next 12 months have already been drawn up.
The project's eventual success in reaching agreements for the commercialisation of Chilean plants should produce an income source that will help to sustain that work after that time. This obviously depends on the success of the commercialisation within the UK and that is difficult to predict. However, the publicity that the project generated during the project produced significant additional funds; one of the legacies of the project is a much higher profile of the plight of the Chilean native forests within the UK and there is no reason to suppose that this will not continue. There is also the possibility of similar agreements for the commercialisation of plants within Chile. Staff from UACh are investigating this possibility

with Sr Gonzálo Awad from Vivero La Huella, a local nursery in Valdivia.

In terms of the people who have actually worked on the project, the majority of them are still involved in conservation work and several are going on to further education as a result of their work. Evidence of this is presented in Tables 2-7. The main partners in the project (UACh and RBGE) will also continue their collaboration on the work started during the project and through the development of new projects.

14. Value for money

The Darwin Initiative contributed a total of £166 505 over the three years. This financial support enabled the project to undertake work which has, in turn, directly generated an additional sum of almost £270 000 in support of conservation work in Chile. Indirectly, the financial support from Darwin has helped to generate a further £140 000 through the work with Rainforest Concern. From that point of view alone, the project represents good value for money.

Appendix I: Project Contribution to Articles under the CBD

PROJECT CONTRIBUTION TO CBD		
Article No./Title	Project %	Article Description
6. General Measures for Conservation & Sustainable Use	5	Develop national strategies that integrate conservation and sustainable use.
7. Identification and Monitoring	15	Identify and monitor components of biological diversity, particularly those requiring urgent conservation; identify processes and activities that have adverse effects; maintain and organise relevant data.
8. In-situ Conservation	10	Establish systems of protected areas with guidelines for selection and management; regulate biological resources, promote protection of habitats; manage areas adjacent to protected areas; restore degraded ecosystems and recovery of threatened species; control risks associated with organisms modified by biotechnology; control spread of alien species; ensure compatibility between sustainable use of resources and their conservation; protect traditional lifestyles and knowledge on biological resources.
9. Ex-situ Conservation	10	Adopt ex-situ measures to conserve and research components of biological diversity, preferably in country of origin; facilitate recovery of threatened species; regulate and manage collection of biological resources.
10. Sustainable Use of Components of Biological Diversity	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.
11. Incentive Measures	20	Establish economically and socially sound incentives to conserve and promote sustainable use of biological diversity.
12. Research and Training	10	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).
15. Access to Genetic Resources	20	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.
Total %	100%	Check % = total 100

Appendix II Outputs

Training Outputs

Code	Total achieved *(proposed)*	Quantity Total to date	Yr	Detail and variation
2	**1** ***(0)***	Num. MScs obtained		Additional
		1	**2**	Darian Stark (Y2 Darwin Scholar; MSc Biodiversity and Taxonomy of Plants; University of Edinburgh/RBGE)
3	**2** ***(0)***	Num. other qualifications obtained		Additional
		1	**2**	Degree completed for Ingeniería Forestal, at Universidad Austral de Chile (C. Martinez) – completion of collaborative work initiated in Year 1
		1	**3**	P Hechenleitner; Honorary Conservation Associate RBGE
4a	**10** ***(14)***	Num.undergraduates receiving training		variation in numbers and duration of training for undergraduate and postgraduate students reflect availability of trainees
		2	**1**	2 undergraduates trained on BG Base
		3+ 3	**2**	3 under graduates on plant records + 3 on propagation
		2	**3**	2 undergraduates in arboretum for 20 hour/week for 3 months
4b	**168** ***(14)***	Num. of training weeks provided to undergraduate students		
		2	**1**	2 undergraduates trained on BG Base, 1 week each
		3+ 3	**2**	3 under graduates on plant records + 3 on propagation
		160	**3**	2 undergraduates in arboretum for 20 hour/week for 3 months calcualted on pro-rata basis (1 training week = 30 hours)
4c	**22** ***(49)***	Num. of postgraduate students receiving training (not 1-3 above)		see 4a for variance
		1+ 1 + 2 + 2	**1**	Sr Gonzalo Medel Darwin Postgraduate Scholar in UK July-October; 1 post grad on BG base (PHV); 2 post grad trained in collection management for 2 weeks each; 2 post grads (PHV and CM) for 4 weeks each
		1+ 4 + 4 + 2	**2**	Sr Darian Stark Darwin Postgraduate Scholar in UK +4 post grads on plant records + 4 on propagation + 2 post grads (PHV and AL for 4 weeks each field work
		1+ 1 + 2 + 1	**3**	Sr Camila Martinez Darwin Postgraduate Scholar in UK July-October + 7 weeks for 1 postgrad -PHV + 2x2 weeks for 2 post grad (CZ and FB); DW for 12 weeks
4d	**120** ***(138)***	Num. of training weeks for postgraduate students		
		16 + 1+ 4 + 8	**1**	Sr Gonzalo Medel July-October + 1 post grad (PHV) on BG Base + 2 weeks each for 2 postgrad students on collection management;2 post grads (PHV and CM) for 4 weeks each

		24 + 4 + 4 + 4 + 8	**2**	Sr Darian Stark Darwin Postgraduate Scholar in UK + 4 for propagation + 2 post grads (PHV and AL for 4 weeks each)
		24 + 7 + 4 + 12	**3**	Sr Camila Martinez Darwin Postgraduate Scholar in UK July-October + 7 weeks for 1 postgrad -PHV + 2x2 weeks for 2 post grad (CZ and FB); DW for 12 weeks
6a	**1** ***(0)***	Num. of people receiving other forms of short-term education/training (i.e not categories 1-5 above)		Additional
		1	**2**	Gonzalo Medel post UK placement in UACh arboretum and at Nasampulli
6b	**12 (0)**	Num. of training weeks not leading to formal qualification		Additional
		12	**2**	Gonzalo Medel post UK placement in UACh arboretum and at Nasampulli
7	**5 (7)**	Num. of types of training materials for use by host country		Manuals combined - see output 10
		2	**1**	management plan for ex-situ collections; guidelines for plant records at UACh
		2	**2**	Project Poster, Seminar CD; extra output from training activities deferred from Year 1 and additional to Year 2; Mininco handbook for threatened flora and fauna
		1	**3**	Spanish version of abbreviated IUCN categories and criteria

Research Outputs

Code	**Total achieved *(proposed)***	**Quantity Total to date**	**Yr**	**Detail and variation**
8	**44.5** ***(34)***	Num. of weeks spent by UK project staff on project work in host country(s)		additional time spent in Chile by UK project leader for benefit sharing negotiations and field work.
		3 + 8	**1**	2 people for (1+2) 3 weeks Sept 02; 2 staff for 4 weeks, Jan Feb 03
		15	**2**	UK personnel in country 7 weeks by one person; 4 weeks each by 2 people
		1.5 + 2 + 15	**3**	1.5 weeks by 1 staff in June, 2 weeks by 1 staff (Oct-Nov) 15 weeks by three staff in Nov-Dec
9	**11** ***(12)***	Num. of species/habitat management plans (or action plans) produced for Governments, public authorities or other implementing agencies in the host country (s)		

		10 + 1	**2**	Habitat management / long-term agreements (6+4) + Book - Lara, A. et al (eds.) 2003: "Componentes Científicos Clave para una Política Nacional sobre Usos, Servicios y Conservación de los bosques Nativos Chilenos". Libro resultante de la Reunión Científica sobre Bosques Nativos realizada en Valdivia, 17-18 de julio de 2003. 134pp (p 65-73)
10	**60** ***(0)***	Num. of formal documents produced to assist work related to species identification, classification and recording.		2 manuals were originally listed under Output 7; other outputs are additional
		1	**2**	Identification Handbook for Mininco
		1 + 12 +46	**3**	Hechenleitner, P., Gardner, M., Thomas, P., Echeverria, C., Escobar, B., Brownless, P. & Martinez, C. 2005 Plantas Amenazadas del Centro-Sur de Chile Distribución, Conservación y Propagación. Primera Edicion. UACh/RBGE Valdivia, Chile 188p; Reports for National Parks and Reserves + 46 IUCN assessments
11a	**8 pending** ***(3)***	Num. of papers published or accepted for publication in peer reviewed journals		4 papers directly related to project work are still in preparation; 4 other papers are derived from MSc research by on of the Darwin scholars
11b	**6** ***(0)***	Num. of papers published or accepted for publication elsewhere		Additional
		6	**3**	See Appendix III for details
12a	**1** ***(1)***	Num. of computer-based databases established for host country		
		1	**1**	September 2002; BG-base installed
12b	**1** ***(0)***	Num. of computer-based databases enhanced for host country		additional
		1	**2**	BG Base upgrade to Version 6.2
13a	**3** ***(1)***	Num. of species reference collections established for host country		Additional sets of mounted specimens deposited at other herbaria
		3	**1**	Darwin Initiative specimen collections; CONC, Santiago, UACh
13b	**6** ***(2)***	Num. of species reference collections enhanced for host country		Additional sets of mounted specimens deposited at other herbaria
		3	**2**	Concepcion, Santiago and UACh herbaria enhanced with specimens from Year 1
		3	**3**	Darwin specimen collection completed and lodged at Santiago, CONC, UACh

Dissemination Outputs

Code	Total achieved *(proposed)*	Quantity Total to date	Yr	Detail and variation
14a	**5** ***(4)***	Num. of conferences/ seminars/ workshops organised for Darwin project work		Additional workshop on genetics organised by project
		3	**2**	2 x 2 day and 1 x 1 day seminars in Chile on identification, conservation and propagation of threatened Chilean plants
		2	**3**	1 x 2 day final project seminar (Nov 04; 34 people) + 1x 3 day genetics workshop (March 05; 16 people);
14b	**10** ***(0)***	Num. of conferences/seminars/ workshops attended		Additional opportunities for dissemination of project work were realised during the project
		1	**1**	Lecture at the International Plant Propagators Society Annual Meeting, Southampton, August 2002 (MFG)
		6	**2**	1 seminar on Juan Fernandez with CONAF botanists, 1 joint seminar with staff from Uni. De Catolica Temuco, 3 in UK (inc. Sept 03 Eden Project (MFG), 1 in Hanoi, Vietnam.
		1 + 1 +1	**3**	8 Sept 2004 MFG Ireland1 A quest for Chilean Treasure 6 Oct 2004 (MFG); Eden presentation by Alovatt; C. Zamorano Conference: Ecological Restoration: A Global Challenge. Zaragoza, Spain September 16 2005
15a	**5** ***(6)***	Num. of national press releases or publicity articles in host country(s)		
		2	**2**	
		2 + 1	**3**	Revista Chile Forestal, March 2005, Por la onservación de las plantas Chilenas; Diaro El Centro El ruil no esta de moda 30/04/2005; El Mercurio, Lo que el alerce 27 june 2004; Press release for publication of manual 30th August 2005
15b	**3** ***(6)***	Num. of local press releases or publicity articles in host country(s)		national press releases were also available locally
		1	**2**	
		2	**4**	El Diaro Austral de Valdivia 17 june 2004; June 2004; local press release for publication of manual, 30th August 2005
15c	**7** ***(3)***	Num. of national press releases or publicity articles in UK		
		2	**2**	
		5	**3**	Rainforest Review, Summer 2004, p6; Evening News Saturday Aug 13; Independent on Sunday 28th August 2005; Botanics, Autumn 2005; local press release for publication of manual, 30th August 2005
15d	**0** ***(6)***	Number of local press releases or publicity articles in UK		national press releases were also available locally

17a	**1 *(0)***	Num. of dissemination networks established		additional
		1	**2**	Group consists of National Park staff contacted during the Year 1 and Year 2 field work and still in regular contact with the Chilean project staff
			3	
19a	**0 *(3)***	Number of national radio interviews/features in host country(s)		publicity outputs were all print or web based
19b	**1 *(0)***	Num. of national radio interviews/features in the UK		
		1	**3**	Radio Scotland Sunday Aug 14 'Beechgrove Potting Shed'
19c	**0 *(6)***	Number of local radio interviews/features in host country (s)		publicity outputs were all print or web based

Physical Outputs

Code	Total achieved *(proposed)*	Quantity Total to date	Yr	Detail and variation
20	**£20k *(0)***	Estimated value (£s) of physical assets handed over to host country(s)		database, Herbarium equipment; field equipment; digital cameras; arboretum and fencng materials
21	**1 *(0)***	Num. of permanent educational/ training/ research facilities established		Propagation facility at UACh arboretum
22	**14 *(10)***	Num. of permanent field plots established		additional plots established
		7 + 4	**2**	field plots of threatened endemic species in the arboretum + Experimental research plots established within 3 protected sites (2 on Mininco property for Pitavia, 2 on Snr. Cifuentes property for Prumnopitys andina) additional outputs from scheduled output 9 and additional to output 22 specified for Year 1 and 2
		3	**3**	Experimental research plots established within 3 protected sites (Bulnes Beilschmeidia, Quebrada Honda 1 & 2, Pitavia

Financial and Uncoded Outputs

Code	Total achieved *(proposed)*	Quantity Total to date	Yr	Detail and variation
23	**£259 k *(0)***	Value of additional resources raised for project		additional

		£1200 + 700	**1**	Salary Costs for employment of Gonzalo Medel (Darwin Postgraduate Scholar at University arboretum November – March 2002; BIOCORES. A European Union project: DGIAC4-CT-2001-10095. Funding for cost of RAPD analysis of populations of *Legrandia concinna*, one of the target species. Research carried out at Universidad Nacional del Comahue, Bariloche, Argentina
		£212 000	**2**	Legacy for training Chilean students at RBGE (£200 000) ; Funding for MSc student (£12 000);
		£ 45 000	**3**	Bromley Trust award (£30 000); RHS £15 000 - various contributions Year 1- 3
XX	**2** ***(1)***	2	**3**	BSA and Access agreements

Appendix III: Publications

* Publications and other material included with this report

Type	Detail (title, author, year)	Language	Publishers	Available from	Cost £
Book	Lara, A., Soto, D., Armesto, J., Donoso, P., Wernli, C., Nahuelhual. L.Squeo. (eds.) 2003: "Componentes Científicos Clave para una Política Nacional sobre Usos, Servicios y Conservación de los bosques Nativos Chilenos". Libro resultante de la Reunión Científica sobre Bosques Nativos realizada en Valdivia, 17-18 de julio de 2003. 134pp	Espagnol	Universidad Austral de Chile. Iniciativa Científica Milenio de Mideplan	Universidad Austral de Chile. Iniciativa Científica Milenio de Mideplan; Pdf summary available from www.forecos.com	20
thesis	Martinez, C. 2004. Análisis de variabilidad genética en *Legrandia conncina* a lo largo de su distribución de geográfica. Tesis Ingeniería Forestal	Espagnol	UACh	UACh	Free
News Article * (Appendix XXX)	Hechenleitner, P., *El Mercurio, Revista 'Vivienda y Decoración'. Nº404, santiago 3 de abril de 2004.* pp 102-105	Espagnol	El Mercurio	El Mercurio	
Article * Appendix XXXIII	Gardner, MF 2003 'Chile' *Friends of Eden, 12: 6-10*	English	Eden Project	Eden Project	Free
Article* Appendix XXXIII	Lovatt, A 2003 'Chile' *Friends of Eden, 11*	English	Eden Project	Eden Project	Free
News Article * (Appendix XXX)	El Diario Austral De Valdivia, 21/4/2003 2003.(Seminar on Conservation of Chilean Plants).	Espagnol	El Diario Austral de Valdivia	El Diario Austral de Valdivia	Free
News Article* (Appendix XXX)	El Diaro Austral de Valdivia 17 june 2004	Espagnol	El Diario Austral de Valdivia	El Diario Austral de Valdivia	Free
News Article* (Appendix XXX)	Echeveria; Lo que el alerce esconde; El Mercurio Sunday 27 June 2004	Espagnol	El Mercurio	El Mercurio	Free
Article * (Appendix XIX)	Hechenleitner, P 2005 A changing role for the arboretum of the Universidad Austral de Chile *Sibbaldia*	English	RBGE	RBGE	subscription
Article * (Appendix XIX)	Gosling et al 2005 Preliminary advice on fruit handling, seed pretreatment and 'germination' of embryos of *Prumnopitys andina Sibbaldia*	English	RBGE	RBGE	subscription
Article * (Appendix XXVI)	Gardner, M.F. & Hechenleitner V., P. 2005. The Myrtles of Chile. *The Plantsman*. 4(3) 170-176	English	RHS	RHS	subscription
Article * Appendix XXVIII	Echeverria 2005 Iniciativa de conservacion de especies arboreas amenazadas y endemicas del centro-sur de Chile.	Espagnol	Jardin Botanico Chagual de Santiago	Jardin Botanico Chagual de Santiago	subscription

Article * Appendix XXXII	Hechenleitner & Becerra 2005; Por la Conservación de las Plantas Chilenas	Espagnol	Revista Chile Forestal	Revista Chile Forestal	subscription
Article * Appendix XXVII	Smith-Ramirez, C., B. Campillo, J. L. Celis-Diez & M. F. Gardner. 2005. Historia natural de la enredadera endémica *Berberidopsis corallina*. En: Smith-Ramírez, C., J.J. Armesto & C. Valdovinos. (eds.).Historia, biodiversidad y ecología de los bosques costeros de Chile: 284-288. 708 pp.	Espagnol (English abstract)	Editorial Universitaria, Santiago, Chile.	Editorial Universitaria, Santiago, Chile.	ca £20
Book * Appendix VI	Hechenleitner, P., Gardner, M., Thomas, P., Echeverria, C., Escobar, B., Brownless, P. & Martinez, C. 2005 Plantas Amenazadas del Centro-Sur de Chile Distribución, Conservación y Propagación. Primera Edicion. UACh/RBGE Valdivia, Chile 188p (In Spanish)	Espagnol	UACh	RBGE/ UACh	free
Article * Appendix XXXIII	Gardner, M. 2005 A Day in the Life of …. The Botanics	English	RBGE	RBGE	free
News Article * Appendix XXXIII	Edwards, 2005 Rare Chilean Plants grown for sale in Britain's chilly climate; Evening News Sat 13 August 2005	English	Evening News	Evening News	subscription
News Article * Appendix XXXIII	Anon; Chilean plant profits will fund conservation; Horticulture Week 1 Sept 2005	English	Horticulture Week	Horticulture Week	subscription
News Article * Appendix XXXIII	Anon 2004 A new partnership with Parques para Chile to protect the Namuncahue Corridor. *Rainforest Review*	English	Rainforest Concern	Rainforest Concern	free
Booklet * Appendix XXV	Guia de Reconocimiento de Especies en Peligro	Espagnol	Forestal Mininco	Forestal Mininco	On request
News Article * Appendix XXXIII	Anon 2004 Quest for Chilean Green Treasure. *The Plantsman*	English	RHS	RHS	subscription

Publications in preparation

Directly related to the Project

- Stark, D, Gardner, M. Thomas, P., Hechenleitner, P., Hollingsworth, P. & Echeverria, C. Conservation genetics of *Pitavia punctata*;
- Martinez, C. Thomas, P., Hechenleitner, P., Gardner, M. & Premoli, A. Genetic Variation in *Legrandia concinna*
- Martinez, C. Hollingsworth, M. Hollingsworth, P. Thomas, P., Gardner, M. & Hechenleitner, P. Genetic variation in *Prumnopitys andina.*
- Mill, R. R. & Stark Schilling, D. Cuticular micromorphology of *Saxegothaea* Lindl. (Podocarpaceae). Botanical Journal of the Linnean Society;

Publications pending associated with MSc studies

- Stark Schilling, D. M. & Mill, R. R. Typification of the Caribbean Podocarps *Podocarpus angustifolius* and *P. aristulatus* and the correct name for *P. aristulatus*. Taxon.
- Mill, R. R. & Stark Schilling, D. M. (2005) Proposal to conserve *Podocarpus aristulatus* Parl. (Podocarpaceae) with a conserved type. Taxon.
- Stark Schilling, D. M,. Mill, R. R. & Möller, M. (2005). Phylogeny of Caribbean species of *Podocarpus* (Podocarpaceae) inferred from chloroplast trnL-F intron / spacer and nuclear rDNA ITS2 sequence data.
- Stark Schilling, D. & Mill, R. R. Cuticular micromorphology of Caribbean species of *Podocarpus* (Podocarpaceae). To be submitted to International Journal of Plant Sciences.;

Appendix IV
Darwin Contact details

Project Title	An integrated conservation programme for threatened endemic forest species in Chile
Ref. No.	162/11/012
UK Leader Details	
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Appendix V: Logical Framework from Year 2. (Updated 5/4/2004 based on Y1 annual report, Y2 half year review)

PROJECT SUMMARY	MEASURABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Goal			
To assist countries rich in biodiversity but poor in resources with the conservation of biological diversity and implementation of the Biodiversity Convention			
Purpose			
To provide Chilean researchers and local land-owners with the knowledge and skills to enable them to protect populations of threatened forest species not included in Chile's network of protected areas, by integrating ex-situ with in-situ conservation, in line with the objectives of the national native forest conservation and management policy.	Development and implementation of habitat management plans, ex-situ collections, agreements with local owners, Chilean government and UK horticultural industry 35 Chilean researchers and horticultural staff trained in and able to display the skills necessary for protecting threatened species outside of protected areas Production of manuals (2) and other publications containing protocols for habitat management, ex-situ collection management and propagation	Annual visits by UK experts Workshop/training reports Publications (manuals research papers etc) available to trained Chilean personnel and other interested parties Oral presentations by trainees Data collected and collections established by Chilean staff and discussed with UK experts during visits	That the need for integrated ex-situ and in-situ conservation programmes will continue That agreements made will continue to be honoured
Outputs	Measurable Indicators	Means of Verification	Important Assumptions
1. Agreement with UK horticultural wholesaler and the Chilean government to commercialise amenity Chilean plants as a source of income to support the long-term conservation of threatened endemic species. **2.** Develop agreements with local landowners for the long-term protection of key habitats containing threatened endemic species. **3.** Develop the arboretum of (UACH) into a centre of excellence for the management of research ex-situ conservation collections	-Signed international agreements obtained fulfilling the requirements of the CBD (1) - Signed agreements obtained which comply with Chilean legislation (Y1 – 5, Y2 – 4) - Key Chileans trained in appropriate skills	- Agreements implemented and working - Protected areas designated - Completed training, establishment of ex-situ collections	Agreements made are honoured by contracting parties - Continued support from local landowners - Wild fires do not cause habitat loss - Continued support from the UACH
Activities			

Networking with local landowners in order to identify priority sites Meetings with Chilean government officials and UK horticultural trade to discuss the commercialisation of Chilean plants in the UK Botanical survey supported by voucher herbarium specimens DNA and propagation materials collected Practical in-situ measures taken Collection and propagation of horticultural plants for commerce Training Chilean scientific and horticultural students in methodologies necessary for conserving threatened endemic species Long-term management plan for arboretum Planting of threatened species for ex-situ conservation. Installation of a database for managing ex-situ conservation collection	- Suitable sites identified and agreements established Agreements obtained which comply with the CBD - Species lists compiled, herbarium specimens identified and mounted with full documentation (each site) - Plants successfully propagated. DNA samples used for biodiversity assessment research (3 species, ca 600 samples) - Protected areas fenced (as needed within budget)) - Plants successfully propagated and grown on - Fully trained personnel - Compilation of plan for internal use (1) and as a model for other collection holders - Established plantings of threatened endemics up to 10 species (Y2 – 5, Y3 – 5) Dataset containing plant records of germplasm in arboretum (1)	- Management plans produced - Agreements working - Species lists published and herbarium material disseminated - Manuals (2) and peer-reviewed scientific papers published (3) - Protected areas recognised - Plant acquisitions achieved in line with signed agreements Relevant publications and manuals produced and personnel carrying out conservation work Implementation of Plan Improved collections of endemic species fully documented and reported on in UACH internal reports Lists printed	- Landowners will co-operate - Parties continue to honour agreements Populations can withstand seed collections Opportunities for employment in conservation work will be available - Continued commitment from UACH