Darwin Initiative for the Survival of Species

Annual Report

1. Darwin Project Information

Project Ref. Number	*162/11/012*
Project Title	*An integrated conservation programme for threatened endemic forest species in Chile*
Country(ies)	*Chile*
UK Contractor	*RBGE*
Partner Organisation(s)	*Universidad Austral de Chile (UACh)*
Darwin Grant Value	*£166 505*
Start/End dates	*April 2002 - April 2005*
Reporting period (1 Apr 200x to 31 Mar 200y) and report number (1,2,3..)	*1 April 2003 – 31 March 2004* *Year 2 annual report*
Project website	
Author(s), date	*MF Gardner, A Lara, CE Echeverria, P Thomas, P Hechenleitner.*

2. Project Background

The rainforests of southern and central Chile represent one quarter of the world's remaining temperate rainforests - 90% of the 900 vascular plant species are endemic and many of these exist only in fragmented forests outside of protected areas. The aim of this project is to provide long-term protection through an integrated programme of ex-situ and in-situ conservation involving a wide range of stakeholders. This will be accomplished by i) providing the necessary training for key horticultural and scientific personnel in ex-situ and in-situ conservation methodologies, ii) working with private landowners to establish agreements in order to protect key endemic species and the development of habitat management plans, iii) ensuring the long term success of the project through an international benefit sharing agreement.

3. Project Purpose and Outputs

- State the purpose and outputs of the project.

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, in line with the objectives of the national native forest conservation and management policy.*
Project outputs : *training for key horticultural and scientific personnel in ex-situ and in-situ conservation methodologies; agreements with private landowners in order to protect key endemic species; habitat management plans; two manuals; international benefit sharing agreement.*

Have the outputs or proposed operational plan been modified over the last year, for what reason, and have these changes been approved by the Darwin Secretariat?

The main operational plan and the project's outputs have not significantly changed. Some changes to project management have been made over the reporting year. Prof. Antonio Lara, the joint project leader, has been on 12 months sabbatical leave at Harvard University in the USA. He is due to return to Chile in August 2004. Prof. Lara has remained closely involved with the negotiations for the benefit sharing agreement. Cristian Echeverria has been responsible for the running of the project during Prof. Lara's absence. 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.
Some of the first year outputs and related activities that were unable to be completed were deferred to the second year and have now been completed. Additionally, two workshop activities (propagation and plant records) planned for the visit by UK staff in January and February 2004 did not take place. The training outputs involved in these workshops have been met by a two seminars and a programme of work experience for new staff and volunteers in the arboretum. Further details are in Section 4 of this report. None of these changes required the approval of the Darwin Secretariat.

4. Progress

Please provide a brief history of the project to the beginning of this reporting period.

The first year of the project (April 2002-March 2003) concentrated on identifying and surveying suitable sites to be included in the proposed network, enhancing the infrastructure of the arboretum, undertaking specified training in Chile and the UK, carrying out fieldwork and initiating the negotiations for the benefit sharing agreement. The second year has seen a continuation and expansion of those activities. Formal agreements with private landowners have been reached; several sites have been fenced and are being monitored. The second year's visit to Chile by the UK staff (Jan-Feb 2004) involved reviewing all project work undertaken to date, meeting with collaborators and undertaking field work to support the final year's work plan. During that visit, a representative of the UK Eden Project accompanied the project team. Two senior scientific staff involved with the training of the second Darwin Scholar also joined the fieldwork for one week. The main fieldwork was further supplemented by an additional two-week visit by the UK project leader. The second Darwin Scholar successfully completed his training and is now undertaking an MSc at the RBGE. A reliable, experienced nurseryman has been identified as a partner for the benefit sharing agreement and negotiations with the relevant organisations in Chile are proceeding. In February 2004, the project was chosen for an external mid-term review. This has recently been completed

- Summarise progress over the last year against the agreed baseline timetable for the period and the logical framework (complete Annex 1). Explain differences including any slippage or additional outputs and activities.

2003/2004 Agreed Baseline Timetable		
Timing	Agreed baseline timetable	**Progress**
April 2003 to March 2004	*Establishment of field plots in arboretum using material collected during Jan03 visit* *Chilean personnel continue protection work with landowners* *Dialogue continued with CONAF, Chilean governmental agencies and UK horticultural industry for CBD based agreement for UK commercialisation of Chilean plants*	**Completed;** 5 estimated, 6 planted **Continuing;** 10 sites under 6 agreements; 3 areas fenced; 2 research plots established **Continuing;** 4 meetings in Chile and 3 in UK; UK grower identified
October – March	*Arrival, training and departure of second CPDS in UK*	**Completed**; training started April 2003 completed October 2004; trainee now undertaking MSc at RBGE
December	*Habitat management plans in place*	**Completed;** 10 sites under 6 agreements
January February 2004	*3rd UK staff visit – project progress review takes place* *3rd training; plant records and propagation workshops, field work training*	**Completed** **Field work training completed; other training reorganised (see below)**

The Year 2 plant record workshop was cancelled as the database was unavailable due to problems with upgrading to a new version (BG-BASE version 6.2). These problems have since been resolved. To compensate, the project's field coordinator (P. Hechenleitner) has been providing training to selected staff and seminars to a wider range of people over the last 2 months. She plans to continue this work in the final year. It is also likely that she will be attending an international workshop on plant records and database management in Xalapa, Mexico (July 2004), run by BG-BASE as part of their worldwide programme of database installation.

The Year 2 propagation workshop was initially deferred until mid-March due to the heavy work schedule proposed for the January-February visit .The visit by the MTR reviewer led to the workshop being postponed again until September 2004. The project's field coordinator (P. Hechenleitner) has initiated a programme of training in propagation techniques and collection management for smaller groups of volunteers within the arboretum. Volunteers are drawn from undergraduates from the forestry school at UACh and will receive approximately 3 hours training each week.

Provide an account of the project's achievements during the last year.

Training (UK).

The second year Darwin Scholar (Darian Stark) successfully completed his training in molecular conservation techniques and is in the process of writing up his results. As a result of his achievements during his Darwin funded training, he has been accepted on to the

RBGE/University of Edinburgh MSc in Biodiversity and Taxonomy. Funding (ca £16 000) has been raised from within the RBGE.

Darian's work has concentrated on the conservation genetics of Pitavia punctata*, one of the project's key species. His work has been 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. These senior scientists visited Chile in January 2004 to gain first hand knowledge of the conservation problems that this project is attempting to address and help fine tune the sampling techniques that have been used in the project. In the course of their visit, it became apparent that genetic research in Chile is heavily orientated towards commercial forestry tree improvement and that there is a demand for more information about the value of genetics in conservation planning. Consequently, project staff have decided to hold a seminar on this subject during the third year if relevant funding is obtained. Representatives from major government conservation organisations (CONAF, CODEF and CONAMA), forestry research organisations and universities from throughout Chile will be invited. Dr P Hollingsworth and Prof R Ennos from the University of Edinburgh, both leading experts in conservation genetics, will lead the seminar. The seminar should contribute to longer-term plans for the establishment of a conservation genetics section at UACh.*

Long Term Training (UK)

The International Conifer Conservation Programme (RBGE) has recently (Dec 2003) received a legacy worth ca £200 000 for the establishment of an endowment trust dedicated to providing training for Chilean post graduate students in conservation methodologies, probably at an MSc level. It is likely that a scholarship will be awarded biennially; the second year of the scholarship will include a period of paid employment within Chile to ensure that the student has an opportunity to gain work experience. It is due to start in September 2005 – immediately after the completion of the current Darwin Initiative.

Training (Chile)

Chilean project staff organised a two-day seminar on the propagation of threatened Chilean flora in April 2003. This was in place of the workshop that was deferred from the first year. The seminar programme involved presentations by representatives of a range of conservation organisations on current research on the conservation of Chilean flora as well as practical demonstrations on ex-situ collection management and propagation techniques. Fifty-four people from ten different forestry and conservation organisations participated. Programme details are included in Appendix 1. This workshop also acted as a forum for dissemination about the Darwin project and has also created an informal dissemination network between project staff and participants about conservation activities.

Chilean project staff also organised and participated in three one-day (August 19th and 20th, December 9th 2003) seminars on the identification, cultivation and conservation of threatened Chilean native plants for Forestry supervisors and technicians working for Forestal Mininco. This is one of the largest forestry companies in Chile; they control significant amounts of remnant native forest within the project's target area. They have also signed an agreement with the project for conservation work 62 people attended the first day, while 40 people attended the second day. Each attendee was presented with a handbook containing pictures and details of threatened plants and animal species likely to be found within Mininco property. Darwin staff (P Hechenleitner) supplied photographs and text for the handbook as well as lectures about conservation and the Darwin Initiative. The first two seminars generated a significant amount of information about the localities of threatened plant populations that proved useful for planning the field work undertaken during the visit by the UK staff. It has also been useful in allowing Mininco staff to prioritise areas for protection on their properties (this was the subject of the third seminar). Some of these areas have been included in the network. Similar training events will be organised during the final year as part of the agreement with Forestal Mininco and Forestal Bio-Bio (see also Section on protected area network and agreements). A one day seminar meeting to review the progress of the Darwin project was held in December 2003 at UACh. Staff involved in this seminar included those from RBGE, UACh, Forestal Mininco, CONAFand PROCER

Chilean staff have recently (April 30th) completed the selection process for the third year Darwin scholar. The level of response has increased substantially since last year with eight applicants shortlisted.

Camilla Martinez completed her thesis 'Análisis de variabilidad genética en Legrandia conncina a lo largo de su distribución de geográfica' *as part of her Forest Engineer's degree at UACh. This work was undertaken in collaboration with the Universidad Nacional del Comahue, Bariloche, Argentina. Her results have indicated that the most northern population of* Legrandia, *(visited during Year 1 field work) is the most genetically distinct; this has allowed the project to prioritise the selection of specific sites for conservation work. Further survey work is being carried out in that general area to establish the feasibility of restoration projects that could link the fragmented northern populations.*

Camilla Martinez, along with Carlos Zamorano (a graduate student from UACh) have also received extensive training in site surveying and assessment within the context of the work that has been done for establishing other parts of the network of protected areas.

Field work

The second year's fieldwork has been highly productive.

In October 2003, the project organised a lecture on "Conservation Problems in Juan Fernandez National Park" by a leading French botanist (Philippe Danton) who is a specialist on the flora of Juan Fernandez at UACh. More than 50 students and staff attended this lecture. Juan Fernandez, an archipelago 667 km off the coast of Chile is one of the key centers of threatened biodiversity in Chile; 37% of the islands' ca 210 species are endemic and the majority are threatened.

In December 2003, two project staff (MF Gardner and P Hechenleitner) followed the contacts made as a result of the lecture and visited Juan Fernandez National Park. The main purpose of the visit was to establish links with CONAF staff responsible for the national park and to investigate areas for future collaborative work (see Section on collaboration). This visit represents an additional project output.

In January and February project staff (including 3 UK staff) undertook a four week programme of field work. This focussed on surveying and ground-truthing reported localities of threatened species and revisiting sites that had been identified in the first year and subsequently adopted in to the network. Over 500 specimens were collected for the major Chilean herbaria as well as the RBGE. Some of these represent significant new distribution records. Mounted specimens from the first year's field work have been deposited in Chilean herbaria.

New populations of 10 species already classified as threatened were located along with new localities for several species that should probably be listed as threatened. Survey work on the threatened conifer Prumnopitys andina *was completed; this species will be the focus for the training of the third year Darwin Scholar. Material was also collected for the development of the arboretum. During fieldwork in the Maule valley, an area rich in biodiversity but completely lacking in reserves or national parks, the team surveyed an area affected by the development of a major new road into Argentina. During the construction, a major population of the threatened endemic shrub (Orites myrtoidea) had been severely damaged. Further investigation showed that the population had not been identified during the environmental study that preceded the work. As a result of the project's work, Chilean staff have been invited to contribute their specialist knowledge to future environmental studies in Region 7. Plans for restoration work on the damaged population are also being discussed; project staff will be involved in future monitoring.*

Protected Area Network; establishment and monitoring

Over the course of the reporting year, Chilean staff made a total of 14 visits to sites that have been included or are being assessed for inclusion within the network of protected sites. A record of each visit has been made – examples are attached in Appendix 2. Currently the network includes 10 sites that contain significant populations of six threatened species.

Management agreements with six different organisations/landowners have been signed. Each agreement is valid for between 5 and 10 years; all are renewable, subject to agreement by both parties. A map of the location of the current sites is included in Appendix 3. *A summary of 3 representative agreements is included in Appendix 4 - copies of all agreements will be included in the final report. The agreement with Forestal Mininco is particularly significant and is further described in Section 12 'Outstanding Achievements'.*

Arboretum

A short report outlining progress in the arboretum is included as Appendix 5

Benefit Sharing Agreement (BSA) – Negotiations

General.

Project staff are placing an increasing emphasis on this crucial aspect of the project and it will be one of the main priorities in the third year .It was originally scheduled to be signed in the second year but this has not been possible. However, a significant amount of progress has been made and the project leaders are confident that an agreement will be reached before the end of the project. The BSA will be between UACh, the RBGE and Liss Forest Nurseries, the UK grower and with relevant Chilean government departments involved in its management. The first draft of this agreement has recently been drawn up by A Lara and circulated for comment.

UK meetings – results.

Negotiations in the UK have concentrated on finding a suitable partner(s) to mange the production and marketing of the plants. The Director of Horticulture at the RBGE, Dr David Rae, has been directly involved in the meetings. Dr Rae is responsible for developing and implementing policies on implementation of the CBD for the RBGE and the European Botanic Garden Consortium. UK staff have also been in contact with staff from the London FIELD center (Darwin project 11/011) and will be drawing on their experience and expertise during the final year. Additionally, UK staff have had contact with counterparts at the Royal Botanic Gardens Kew who have been involved in establishing an access to genetic resources agreement with INIA (Instituto Nacional de Investigación Agropecurias), the Chilean government organisation that is in charge of the National Base Seed Bank and other activities related to the conservation of genetic resources. .

An informal agreement has been reached with Liss Forest Nurseries (owner Peter Catt), a highly respected nursery with considerable experience in the development and marketing of new plant varieties. The owners have a strong interest in conservation and a particular interest in the Chilean flora. They have agreed to subsidise the costs of propagation, production, distribution and marketing within the UK. A second firm, Genesis Ltd, will be responsible for monitoring the sale of plants under the terms of the Plant Breeder's Rights Act and for collecting the levy. Precise details on the size of the levy, accounting responsibilities and the mechanism for the actual transfer of money to Chile will be finalised during the third year as an agreement in Chile is finalised. Ten species have been selected for evaluation and commercialisation; living material is currently being held at the arboretum in UACh and at the RBGE.

Chile meetings – results

A series of meetings have been held between Chilean project staff (A Lara (by phone), C Echeverria and P Hechenleitner) with officials from CONAMA (the organisation responsible for Chile's implementation of the CBD, main contact Tea Garcia), ODEPA (Oficina de Estudios y Politicas Agrarias, main contact Teresa Aguero) to discuss the Chilean government's policies on benefit sharing agreements and Dr Pedro Leon (INIA).Dr Leon has provided a model Germplasm Access Agreement that has been used by organisations such as INIA in the past. Government officials have been highly supportive of the rationale behind the proposed agreement.

In the course of these discussions it has become apparent that Chile is still developing its national policy and that currently there are no formal regulations governing BSAs. This is

also the conclusion of the Darwin project run by the FIELD legal institute in London (project 11/011, Access, benefit sharing and traditional knowledge in Chile). All existing BSAs are effectively private arrangements. Some agreements have been criticised for lack of clarity and lack of involvement of government departments in their management and in decisions about use of the benefits. From one perspective, it is unfortunate that there are no formal guidelines for the project to follow. However, with the benefit of hindsight, the example of other agreements and input from the FIELD Darwin project, our project now has an opportunity to 'lead the way' by establishing a model agreement. The CONAMA officials that have been involved with the meetings have repeatedly stressed that this BSA should be a model for future activities relating to benefit sharing. A management committee will be formed, involving representatives of the signatories as well as representatives from CONAMA. This committee will specify how any funds raised are to be used. The formation of a committee has been noted by CONAMA officials as a sign of the commitment of this project to 'fair and equitable benefit sharing'. Project leaders will meet in Santiago in June 2004 to discuss the draft.

- **Discuss any significant difficulties encountered during the year and steps taken to overcome them.**

The most significant difficulty that has been encountered has been the lack of a national policy on benefit sharing agreements. The implications of this and the steps that have been taken to overcome it are discussed in the preceding section.

At a wider level, the Chilean government approved a new law (Decree 525 from the Minitsry of Agriculture, Nov 2003) that has significantly reduced the legal protection to threatened plant species. This decree reduces the protection of these species during private or public developments. There has also been an increase in the illegal cutting and destruction of trees such as Fitzroya cupressoides*. Our project has responded by increasing its collaboration with government organisations such as CONAMA and CONAF as well as major timber companies such as Mininco (See Section 6)*

- **Has the design of the project been enhanced over the last year, e.g. refining methods, indicators for measuring achievements, exit strategy?**

The logical framework has been modified and clarified in line with the Year 1 reviewer's comments and feedback from the MTR.. The main modification relates to the use of the number of agreements as an indicator. In the original proposal, it was envisaged that there would be one agreement per site. In practice, agreements may cover several sites (e.g. the agreements with Forestal Minico and Forestal Bio-Bio). New indicators have been added to help assist in assessing the development of arboretum. The revised version is attached. The exit strategy has not changed but see Progress Section and Post Project Funding Sections for further information.

- **Present a timetable (workplan) for the next reporting period.**

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2004/2005 workplan Year 3		
Timing	Original Agreed Schedule	Revised Schedule
April	*2nd Annual report submitted*	Delayed due to mid-term review and commitments of UK staff - submitted before May 10 with Darwin monitors approval
May	*Chilean personnel continue protection work with landowners, identification of new protected areas, development of arboretum*	As per agreed schedule
June	*As May*	As per agreed schedule Extra visit to Chile by UK project leader for benefit sharing agreement negotiations
July	*As May*	As per agreed schedule
Aug-Sep	*As May*	As per agreed schedule
Oct.	*Arrival, training and departure of third CPDS in UK* *As May*	As per agreed schedule
Nov.	*As May*	UK staff visit – project progress review, training, field work Dissemination seminar involving extra UK staff
Dec.	*Submission of papers to peer reviewed journals/ Final drafts of manuals completed*	UK staff visit – project progress review, training, field work, Dissemination seminar involving extra UK staff. *Drafts of manuals available for seminar*
Jan 05	*4th UK staff visit – project progress review, 4th training, field work, habitat management plans produced Dissemination seminar takes place*	*Habitat management plans produced*
Feb		*Manuals completed and published; scientific papers submitted*
Mar.		Benefit Sharing Agreement in place
April/May	*Final Report*	Final Report

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

- **Have you responded to issues raised in the review of your last year's annual report? Have you discussed the review with your collaborators? Briefly describe what actions have been taken as a result of recommendations from last year's review.**

The reviewer for the first year of the project made three requests. Two of these were dealt with in the Year 2 half-year report. The third, more information about the progress of the discussions for the benefit sharing agreement, is included in section 4 of this report. The response to the reviewer's request was made after consultation with all project members.

The project has also received the report from the recent MTR. One recommendation is that the project increases its dissemination activities; an increase in training/dissemination activities with the Forestal companies is already planned for the first 6 months of the final year and it is likely that there will be more workshops organised or attended by project staff than originally planned. There will also be greater contact with the Darwin project 162/11/01. (Access to genetic resources, benefit sharing and traditional knowledge in Chile).

The MTR further recommends that the project considers 'how to develop from the current species focussed approach to address the conservation issues at a habitat and landscape scale'. The project is undertaking this type of work directly through its agreement with Forestal Mininco, its collaboration with other environmental project such as BIOCORES and CONAMA VII Region (See section 6). The surveying work on threatened species is also contributing significant baseline data that will facilitate work at a habitat and landscape scale.

The reviewer for the MTR recommends (and offers to facilitate) establishing contact with organisations undertaking similar work in Brazil, especially the establishment of private reserves. International links of this nature would be very beneficial for all concerned. Although the current project does not have a budget for such activities other sources of finance will be investigated. Such work could also be included in a follow up project.

6. Partnerships

Describe collaboration between UK and host country partner(s) over the last year. Are there difficulties or unforeseen problems or advantages of these relationships?

Collaboration between the RBGE and UACH remains excellent and is developing in new ways. Early results from the project's work are emphasising the importance of conservation genetics in conservation planning within Chile. There is a strong interest in this area within UACh (and in Chile in general) where genetics is generally associated with commercial crop improvement. The RBGE has a considerable amount of in-house expertise as well as strong partnerships with other UK organisations (e.g. University of Edinburgh) that also have those skills. The strengths of UACh as a leading center for research into aspects Chilean native forests such as ecology, vegetation mapping, dendrology and dendrochronology are highly complementary to the specialist skills of the RBGE. This synergy is becoming more evident as the project progresses and there have been positive discussions with senior RBGE scientists and senior university officials about the possibility of establishing a molecular laboratory within the university. This would be a project for the longer term.

Has the project been able to collaborate with similar projects (Darwin or other) in the host country or other regions, or establish new links with / between local or international organisations involved in biodiversity conservation?

Collaborative work with government agencies such as CONAF is continuing. Links established with National Parks staff during the visit by UK staff in the first year have been maintained. This has resulted in a flow of living material to the arboretum that is assisting the objective of establishing the living collections as a reference center for Chilean flora from central and southern Chile. The links are also promoting the continued flow of information about the current status of populations of threatened plants within the National Parks and in the areas adjacent to them. In return, project staff are providing information about threatened plants and conservation work in other areas. In this sense, effective dissemination networks are emerging. It is anticipated that contacts made during the fieldwork in January and February 2004 will produce the same results.

Joint research work with other universities on the regeneration requirements of selected threatened species is being facilitated through the network of protected sites. An example is the joint monitoring of the regeneration of Prumnopitys andina *at one of the protected sites (Senor Cifuentes site, Los Lleques, Region IX) by undergraduate researchers from the Unversidad Catolica Temuco and project staff. Collaborative work is being undertaken with the BIOCORES (Biological Conservation, Restoration and Sustainable Use in Fragmented Forest Landscape) researchers on the restoration of* Legrandia concinna *and* Fitzroya cupressoides. *The Darwin project is also supporting work with the Chilean government funded FONDEFF project. The FONDEFF project is mainly focussed on large scale production 39 key woody Chilean species, including seven threatened species. Our project has been supplying seed of threatened species (these are sourced during project field work and as a result of contacts with National Park staff.) In return, surplus material will be*

available for restoration work. Staff from the FONDEFF project (Bernardo Escobar) will be involved in the production of the manuals in the third year.

P Hechenleitner has initiated a collaborative programme focusing on the distribution and ecology of the threatened monotypic endemic genus Valdivia gayana*, in association with representatives of the Bioforest company of Forestal Arauco and RBGE staff. This is one of the most unusual and emblematic species in the Chilean flora as it is a semi-epiphytic herb found only on the ceilings and walls of certain caves in the Valdivian rainforest fragments around Valdivia. The project will undertake a comprehensive survey to establish its distribution and conservation status as well as studying its ecology and cultivation requirements.*

C. Echeverria, the joint project leader in Chile, has been a key player in a community based restoration project focussing on the most threatened coastal population of Araucaria araucana *at Villa los Araucaria over the last 2 years. Until recently, the restoration project has been limited to small areas owned by the local communities or other private landowners. In the surrounding areas, a significant part of the population is located on land controlled by Forestal Mininco. As a result of the agreement between the DI project and that company, these previously excluded populations have been included in the restoration project under a separate agreement.*

One of the aims of this Darwin Initiative is to develop the arboretum as a centre of excellence for research and ex-situ conservation for threatened Chilean plants. Consequently, the project is establishing and enhancing links with other botanic gardens in Chile. A particular area of interest relates to the threatened flora of Juan Fernandez National Park. Currently, the Vina del Mar Botanic Garden near Santiago is the only Chilean botanic garden cultivating plants from that area; their work is hampered by the differences in climate and growing conditions between Santiago (within the Mediterranean zone) and Juan Fenandez (cool, moist temperate zone). The project will be seeking to develop a three-way collaborative link that will contribute to the conservation of Juan Fernandez flora. Two project staff are due to meet with staff from Vina del Mar in June 2004. Additional links are being established with the new Chagual Botanic Garden in Santiago; project staff will visit the garden in June 2004.

The first annual report mentioned the involvement of UK and Chilean staff with the UK based charity Rainforest Concern in the establishment of a private nature reserve at Nasampulli. Further land purchases have been made and the reserve has expanded to include a total of 350 ha. The first year Darwin Scholar, Gonzalo Medel, has recently been appointed to manage the reserve and to supervise further acquisitions.

7. Impact and Sustainability

Discuss the profile of the project within the country and what efforts have been made during the year to promote the work. What evidence is there for increasing interest and capacity for biodiversity resulting from the project? Is there a satisfactory exit strategy for the project in place?

The profile of the project within Chile is increasing as the project's work develops. The process of establishing the network of sites with their associated agreements has necessarily raised our profile through contact with owners. Meetings concerning the benefit sharing agreement mean that government representatives are aware of the project. Interpretation signs and posters at protected sites and within the arboretum combined with articles in national and local newspapers are raising the general public profile. Outside of the Chile, UK staff have been actively raising the profile of the Chilean work. The project leader (MF Gardner) has given 3 seminars in the UK in which the project was publicised. An outline of the project was presented at the final workshop of another Darwin project (162/10/017, Preservation, Rehabilitation and Utilisation of Vietnamese Montane Forests) in Hanoi in February 2004. During the field work in January and February, the project team was accompanied by a member of the Eden Project (Mr Adrian Lovatt). Since his return, he has given a number of presentations to the staff at Eden. Information about the Darwin project is due to be incorporated into displays at Eden in the near future (Year 3). Visitor numbers at

Eden are currently running at ca 1.5 million per annum so the project's UK profile should rise substantially in its final year. An article about the project has also appeared in the Friends of Eden magazine. Part of our dissemination strategy is to maximise the project's profile just before the selected species are released onto the UK market.

The evidence for the increase in interest and capacity for biodiversity resulting from this project is manifesting itself in several ways. The agreements with forestry companies such as Forestal Mininco and Forestal Bio-Bio involve Chilean project staff training key members of those organisations in conservation methodologies, enabling them to train continue training other staff members. The company has also recognised that this project can play a key role in assisting them to gain and maintain certification of their forestry practices. The environmental practices of Forestal Mininco have recently been reviewed by an international environmental monitoring organisation, Forest Ethics. Their report has noted the improvement in the company's performance, especially regarding threatened species. A large part of this improvement has been attributed that to the involvement of the Darwin project and the development of agreements for the conservation of particular sites

Project staff are increasingly in demand to act as consultants for organisations such as CONAMA who are responsible for Environmental Impact Assessments of development projects. One clear example of this is that the results of C. Echeverría's M. Phil thesis on deforestation and fragmentation in temperate forests have been requested by CONAMA-VII region representatives to assess the potential impact that these processes have had on the biodiversity of the region (this region has been widely visited by project staff). Changes in land use are one of the processes that Governmental organisations are incorporating in the development of a strategy for biological conservation. The Chilean project leaders have also supported the development of an undergraduate thesis (Patricio Romero, UACh) on the identification of priority sites for biodiversity conservation in the VII region. Results showed the need to have updated information on the status of conservation of threatened plant species and monitor land use changes over time.

This collaboration has resulted in a formal agreement between CONAMA-VII region and the UACH to carry out collaborative work on biodiversity conservation and capacity building.

This work can be seen as a form of training/knowledge exchange for the CONAMA staff; in turn the CONAMA staff are in a position to pass on their new knowledge to other members of their organisation that the Darwin project may not have contact with.

Exit strategy

The work undertaken in Year 2 has consolidated much of the work initiated in the first year. Finalisation of the BSA, along with the development of post project funding ideas over the course of the final year should help to ensure its legacy and facilitate the exit strategy in the longer term. As noted in the MTR, sustaining the work of the project in the short term may be problematic.

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

The project is initiating alternative and novel approaches to conservation through collaboration with a wide range of stakeholders. The project is also generating a significant increase in knowledge about the current status of threatened species and their habitats.

Two informal networks are gradually being created by the project. Both of these could be developed and consolidated with the support of post-project funding. The first would represent sites with threatened plants and habitats, including those identified by project staff and those being developed by other organisations. Such a network would be supported by the development of the conservation activities currently centred on UACH's Institute of Silviculture and its arboretum.

The second informal network involves dissemination about conservation issues between people involved in the current project. This could be developed to embrace small and large private landowners, commercial companies, universities, NGOs and government departments responsible for protected areas, environmental issues and genetic resources throughout

central and southern Chile. Such a network would be effective at local, regional, national and international levels.

Post project activities would focus on the development and consolidation of these networks. Major outputs would include a widely accessible database of all known localities for the threatened species of south and central Chile, restoration and recovery programmes for specific species and habitats at local and regional level and the design of a system for monitoring the status of threatened species and disseminating that information to relevant parties at local, regional, national and global level.

- What evidence is there of strong commitment and capacity by host country partners to enable them to play a major role in follow-up activities?

UACh is one of the leading organisations involved in the research and conservation of Chilean native forests. It is committed to establishing a Centre for Native Forests that would provide an institutionally based management framework to coordinate a wide range of projects and programmes. Post project activities would fall within this framework and be implemented by project staff from UACh with the support of the RBGE.

9. Outputs, Outcomes and Dissemination

Explain differences in actual outputs against those agreed in the initial 'Project Implementation Timetable' and the 'Project Outputs Schedule', i.e. what outputs were not or only partly achieved? **Were additional outputs achieved?** Provide details of dissemination activities in the host country during the year, including information on target audiences. Will dissemination activities be continued by the host country when the project finishes, and how will this be funded and implemented?

The differences in the actual outputs compared to those in the Implementaion Timetable and the Project Outputs Schedule are explained in Section 4 and in Table 1. Additional outputs are also explained in Table 1.

Dissemination activities: specific activities have been explained in Sections 4, 6 and 7. The principal target audience has been landowners, their employees and students, staff and fellow researchers in universities and colleges. In the UK, target audiences have included horticultural businesses as well as the general public. The project outline and progress to date was presented at the final seminar of the Darwin project 162/10/017'Preservation, Rehabilitation and Utilisation of Vietnamese Montane Forests'. The Chilean work was very well received as the model (partnerships between local private landowners, private forestry companies, government departments, NGO's and research organisations) is almost unheard of in Vietnam although it is likely to become more relevant as Vietnam changes towards a more capitalist economy.

Some post-project dissemination activities will be linked to post project funding proposals. Other activities, such as the dissemination network between UACh and National Park staff and Forestal employees referred to in Section 4 are capable of being continued on an informal basis.

- Please expand and complete Table 1. **Quantify** project outputs over the last year using the coding and format from the Darwin Initiative Standard Output Measures (see website for details) and give a brief description. Please list and report on appropriate Code Nos. only. The level of detail required is specified in the Guidance notes on Output Definitions, which accompanies the List of Standard Output Measures

  Table 1. Project Outputs (According to Standard Output Measures)

Outputs from Implementation Timetable and Project Outputs Schedule 2003/2004			
Output Code	**Scheduled Output Qty**	**Achieved Quantity**	**Description**

22	*5*	***7***	field plots of threatened endemic species in the arboretum
9	*4*	***6***	Habitat management / long-term agreements
4C/4D	1/24	1/24	Darwin Scholar UK
8	*12*	***15***	UK personnel in host country (see section 4 for additional field work)
22	*5*	***10***	Management plans for sites with threatened endemic woody plants; represents completion of Year 1and 2 scheduled outputs.
4/A,B,C,D	*14 students; 8.4 weeks total - 0.6 weeks each*	***7 staff/ students; 7 weeks)***	Original: 3-5 day Plant records workshop;Achieved: 7 staff/students trained for a total of one week each over period of 6 months (also see seminars) See also section 4
4/A,B,C,D	*14 students; 14 weeks total – 1.0 training week each*	***7 staff/ students; 7 weeks)***	Original: 5 day Propagation workshop Achieved: 7 staff/students/volunteers trained for a total of one week each over period of 6 months also see seminars) See also section 4
15/A,B, C	*2,2,2*	***1, 1, 2***	Press releases published in Chilean local (2) and Chilean national newspapers (2), UK papers (2)Represents outputs deferred from Year 1

Additional Outputs achieved 2003-2004 and not listed in Implementation Timetable and Project Outputs Schedule for Year 2			
3	***0***	***1***	Degree completed for *Ingeniería Forestal, at* Universidad Austral de Chile (C. Martinez) – completion of collaborative work initiated in Year 1
7	***0***	***2***	Project Poster, Seminar CD; extra output from training activities deferred from Year 1 and additional to Year 2
9	***0***	***1***	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 (p 65-73) This book includes recommendations on threatened species and the importance of keeping up-to-date information on these plants. The work of the project is covered in pages 65-73.
10	***0***	***1***	Identification Handbook for Mininco; extra output from training activities deferred from Year 1 and additional to Year 2
12B	***0***	***1***	Arboretum database, upgraded to BG-Base Vers. 6.2; Chilean taxonomic data enhanced
13B	***0***	***2***	Concepcion and Santiago herbaria enhanced with specimens from Year 1; further enhancement due at the end of Year 3
14A	***0***	***3***	(a, b) 2 x 2 day and (c) 1 x 1 day seminars in Chile on a) conservation and propagation of threatened Chilean plants – 55 people b) and c) identification and conservation of threatened Chilean plants (102 people) c) extra output from training activities deferred from

			Year 1 and additional to Year 2
14B	***0***	***6***	1 seminar on Juan Fernandez with CONAF botanists, 1 joint seminar with staff from Uni. De Catolica Temuco, 3 in UK, 1 in Hanoi, Vietnam.
17A	***0***	***1***	Group consists of National Park staff contacted during the Year 1 and Year 2 field work and still in regular contact with the project (see section 4)
22	***0***	***4***	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
23		***£ 216 K***	Legacy for training Chilean students at RBGE (£200 000) ; Funding for MSc student (£16 000)

Table 2: Publications

Type *(e.g. journals, manual, CD)	Detail (title, author, year)	Publishers (name city)	*Available from* (e.g. contact address, website)	Cost £
Book/Proceedings	**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	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	UACh	UACh	No charge
Newspaper article	Hechenleitner, P., *El Mercurio, Revista 'Vivienda y Decoración'. Nº404, santiago 3 de abril de 2004. Pages: 102-105*	El Mercurio	El Mercurio	Free
Newspaper article	Gardner, MF 2003 'Chile' *Friends of Eden, 12: 6-10*	Eden Project	Eden Project	Free
Newspaper article	Lovatt, A 2003 'Chile' *Friends of Eden, 11*	Eden Project	Eden Project	Free
Newspaper article	EL DIARIO AUSTRAL DE VALDIVIA,	EL DIARIO AUSTRAL	EL DIARIO AUSTRAL DE VALDIVIA	Free

21/4/2003 2003.(Seminar on Conservation of Chilean Plants).	DE VALDIVIA	

*'Key Scientific components for a national policy regarding the uses, services and conservation of native forests in Chile'. *This book includes recommendations on threatened species and the importance of keeping up-to-date information on these plants. The work of the project is covered in pages 65-73.*

The MTR recommended that the project consider ways of developing from the current species focussed approach to address conservation issues at a habitat and landscape level. Some elements of the current project are addressing this issue. It is also being addressed in the other work that project staff are involved in. In the last year project staff have published several papers that demonstrate this. Although they are not direct outputs from this Darwin project, details are included in Appendix 6 in support of the preceding statements.

10. Project Expenditure

- Please expand and complete Table 3.

Table 3: Project expenditure during the reporting period (Defra Financial Year

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

- Highlight any recently agreed changes to the budget and explain any variation in expenditure where this is +/- 10% of the budget.

Not applicable

11. Monitoring, Evaluation and Lessons

- Discuss methods employed to monitor and evaluate the project this year. How can you demonstrate that the outputs and outcomes of the project actually contribute to the project purpose? i.e. what are the indicators of achievements (both qualitative and quantitative) and how are you measuring these?

Monitoring and Evaluation
The principal method used to monitor and evaluate the project has been a series of review meetings involving all staff at critical stages of the project. Minuted meetings have been held in the UK and Chile. There have been frequent telephone conversations in addition to regular email contact. Work-plans are drawn up and revised as necessary. The Mid Term Review (MTR) also assisted this process.

Outputs, outcomes and their relation to the project purpose.
The project purpose has been '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'. The protected areas selected are all outside of 'Chile's network of protected areas' and all include specific 'threatened forest species'. The provision of 'knowledge and skills to enable' protection of such areas is reflected in the content of the management agreements and in the content and focus of the training. Integration of ex-situ and in-situ conservation is reflected by the development of the arboretum, its use as a training/education facility and in the use of material grown in the arboretum for restoration work at selected sites in addition to the dissemination network established with National Park staff , employees of forestry companies and other research organisations. The effectiveness of the indicators is difficult to assess at this stage as the timescale for the impact of the work undertaken by this project is longer than the funding term.

- What lessons have you learned from this year's work, and can you build this learning into future plans?

The second year's work has reinforced the value of regular progress reviews as a way of ensuring that the project meets its targets and is able to manage and deal with problems as they arise. Internal reviews will be continued in the third year. The MTR proved to be a very constructive experience for all project members. Ideally, future projects would include such a process.

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

An integrated conservation programme for threatened endemic forest species in Chile

Over the last 30 years most of the species rich forests in the Chilean Coastal Cordillera in the Maule, BioBio and Araucania regions have been cleared and replaced with commercial plantations. The plantations, and most of the remaining native forests, are controlled by forestry companies. As part of their drive for certification these companies are undertaking biodiversity audits and implementing management plans for selected threatened species and habitats within the remnants that they control.

One major achievement of the second year of this project is the signing of an agreement between the Universidad Austral de Chile (UACh) and Forestal Mininco, one of the largest of these companies. Project staff will be providing training in the identification and conservation of threatened species as well as being involved in formulating management policies for the protection and expansion of remnant forests. Recovery plans for threatened species such as Pitavia punctata are underway. Research at the Royal Botanic Garden Edinburgh, undertaken as part of the Darwin project's training and capacity building, has identified significant genetic differences between the Pitavia populations on Mininco land and those in other areas. Three of these populations are now under specific management plans. The agreement is the first of its kind in Chile and represents significant progress in the conservation of remnant native forests outside of the reserve system.

Not all forest fragments are controlled by the companies. Some small, traditional landowners have retained the native forests which they manage for charcoal and firewood. The Darwin project has made an agreement with one such landowner, whose land contains part of the only currently known coastal population of the threatened conifer Prumnopitys andina. This property, like many others, is almost entirely surrounded by commercial plantations owned by

companies such as Mininco. The project's links with both the forestry companies and smaller landowners should result in more effective regional conservation activities than if it was working with just one sector.

A second major achievement is the signing of a long term agreement between UACh and CONAMA, the government agency responsible for the environment. Under this agreement staff will provide specialist knowledge about threatened plants as well as deforestation and fragmentation processes.

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

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

Project summary	Measurable Indicators	Progress and Achievements April 2003-Mar 2004	Actions required/planned for next period
Goal*:* To draw on expertise relevant to biodiversity from within the United Kingdom to work with local partners in countries rich in biodiversity but poor in resources to achieve • The conservation of biological diversity, • The sustainable use of its components, and • The fair and equitable sharing of the benefits arising out of the utilisation of genetic resources			
Purpose *(insert original project purpose statement)* 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	(insert original purpose level indicators) **1** Development and implementation of habitat management plans and agreements with local owners; ex-situ collections established and arboretum enhanced with database and propagation facilities; agreement with Chilean government and UK horticultural industry for commercialisation of Chilean native plants **2** 35 Chilean researchers and horticultural staff trained in and able to display the skills necessary for protecting threatened species outside of protected areas ***3*** Production of manuals (2) and other publications containing protocols for habitat management, ex-situ collection management and propagation	*(impacts and achievements against purpose indicators – if any)* ***1*** Pioneer agreement with major forestry company made, agreements with other landowners; project staff as specialist consultants to CONAMA for threatened plants surveys and environmental impact assessments (Region 7) ***2*** Major training/dissemination events held; dissemination networks established; project profile raised ***3*** Outline for manuals drawn up, scientific papers in preparation	*(report any lessons learned resulting from the project & highlight key actions planning for next period* **1** *Protection agreements entrenched; ex-situ collections expanded, commercialisation agreement signed; arboretum development plans finalised* **2** *Dissemination workshops planned and held; Year 3 Darwin Scholar trained* **3** *Manuals published, scientific papers submitted*
Outputs*(insert original outputs – one per line)*	*(insert original output level indicators)*	*(report completed activities and outcomes that contribute toward outputs and indicators)*	*(report any lessons learned resulting from the project & highlight key actions planning for next period)*
1. *Agreement with UK horticul tural wholesaler and the Chilean government to commercialise amenity Chilean plants as a source of income to support the long-term*	**1.** Signed agreements obtained fulfilling the requirements of the CBD (1)	Meetings with CONAMA, ODEPA and CONAF held, UK nursery identified, target species selected	*Agreement between UACh, RBGE and UK nursery to be signed; management committee including CONAMA staff set up*

conservation of threatened species			
2. *Agreements with local landowners for the long-term protection of key habitats containing threatened endemic species.*	***2.****Signed agreements obtained which comply with Chilean legislation (Y1 – 5, Y2 – 4)*	6 agreements for 10 sites with 6 threatened species;	Agreements maintained; sites revisited.
3. *Develop the arboretum of (UACH) into a centre of excellence for the management of research ex-situ conservation collections*	***3.*** *Key Chileans trained in appropriate skills; 50% of threatened woody species from south and central Chile represented in arboretum*	Conservation plantings of 6 threatened species in arboretum; propagation facility and database established, management plan in progress	Finalise management plan; complete representation of threatened woody species

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

Appendices

Programme from 2 day seminar in April 2003

Summary of conservation agreements

OTHER BITS AND PIECES

Appendix 1

Organiza: Iniciativa Darwin (2002-2005) - Programa de Conservación Integrado para las Especies Forestales Endémicas Amenazadas de Chile

Edifi cio Fac. Cs. Forestales 3 ° piso • Campus Isla Teja, Valdivia. Chile • Casilla 567 • Fono: 293026 • email: silvicul@uach.cl

1er SEMINARIO-TALLER

"Propagación de Especies Nativas con Fines de Conservación"

Valdivia, 22 y 23 de abril de 2003

Martes - 22 de abril: Salón Jorge Millas

0900 -0930 Inscripción.

0930- 0940 Palabras de Apertura. Andrés Iroumé, Decano Facultad de Cs. Forestales, U. Austral.

0940 -1000 Programa de Conservación Iniciativa Darwin. Dr. Antonio Lara, Fac. de Cs. Forestales, U. Austral.

1000-1020 Experiencias en conservación de especies nativas chilenas en riesgo de extinción en el SNASPE. Ivan Benoit, CONAF, Santiago.

*1020-1040 Necesidades de conservación in situ de algunas especies chilenas amenazadas. Dr. Carlos LeQuesne, Facultad de Cs. Forestales, U. A*ustral.

1040-1100 Conservación ex situ de especies chilenas en el Arboretum de la UACH. Paulina Hechenleitner, Facultad de Cs. Forestales, U. Austral.

1100-1130 Café

1130-1150 Propuesta de conservación in-situ en la VII región fuera del SNASPE. Patricio Olivares, Ing. Forestal, CONAMA, VII Región.

1150-1210 Experiencias en biotecnología para Pitavia punctata y propagación de Gomortega keule. Hermes Castellanos, Ing. Forestal, Universidad de Concepción.

1210-1230 Tecnología y desarrollo en la producción comercial de helechos nativos. Anja George, Vivero Río Tijeral, Osorno.

1230-1250 Propagación vegetativa de plantas nativas amenazadas. Dr. Peter Seemann, Facultad de Agronomía, U. Austral.

Jornada Tarde

1500-1520 Propagación y viverización de dos Nothofagus endémicos de la zona mesomórfica con problemas de conservación. Rómulo Santelices, Dpto. Cs. Forestales, Universidad Católica del Maule.

1520-1540 Cultivo de especies nativas con propiedades ornamentales, una alternativa de conservación ex-situ de

Appendix 1(cont)

plantas amenazadas. Ema Hermosilla, Proyecto Administración Ambiental Corporativo, U. Austral.
15^{40}-16^{00} Conservación in vitro de cactáceas nativas. Claudia Rodríguez, Fac. de Agronomía, U. Austral.
16^{00}-16^{20} Desarrollo de tecnologías para la generación de una oferta diversificada de especies nativas leñosas. Alberto Zúñiga, Fac. de Cs. Forestales, U. Austral.
16^{20}-16^{50} Café
17^{00}-18^{30} Mesa Redonda (modera Dr. Juan Schlatter, Director Inst. Silvicultura)

Miércoles - 23 de abril: Salida a terreno
Mañana
09^{00} -12^{00} Actividades prácticas en Arboretum de la Facultad deCs. Forestales, U. Austral.
- *Reconocimiento de especies chilenas, manejo de colecciones*
- *Etiquetado y registro de accesiones*
- *Actividades de selección y cosecha de estacas*

Paulina Hechenleitner, Bernardo Escobar, Luis Soto, Gonzalo Medel.
Tarde
15^{00}-17^{30} Actividades prácticas en Vivero de Instituto de Silvicultura.
- *Preparación y montaje de estacas*

Bernardo Escobar, Fernando Utreras.
17^{30}-18^{30} Clausura y entrega de certificados (Sala de reuniones CEFOR).

<table>
<tr><td colspan="3">Nombre de la Propiedad:
Sector Los Barros (Angol)</td><td colspan="2">Personal del Proyecto
PHV, MFG, PT</td><td>Fecha de la visita:
22.01.04</td></tr>
<tr><td colspan="3" rowspan="4">Propìetario:
Forestal Mininco</td><td colspan="3">Nombre de Principal contacto Anita Smülders</td></tr>
<tr><td colspan="3">Posición
Encargada Tema Biodiversidad de Forestal Mininco</td></tr>
<tr><td colspan="3">Empresa</td></tr>
<tr><td>Teléfono</td><td colspan="2">Fax</td></tr>
<tr><td>Detalles de ubicación de la propiedad</td><td colspan="2">Region: IX, Araucanía</td><td colspan="3">Teéfono celular</td><td>Email</td></tr>
<tr><td colspan="3">Provincia, Comuna
Malleco, Angol</td><td colspan="3">Especies de interés:
Pitavia punctata (Los Barros – F.Minico)</td></tr>
<tr><td colspan="3">Ubicación

3. Sector Los Barros, Cordillera de Nahuelbuta. Área de protección de Forestal Mininco</td><td colspan="3">Área a proteger:</td></tr>
<tr><td colspan="3">Número de individuos a proteger:
Al menos 100 individuos, pero tal vez haya más individuos.</td><td colspan="3">Número de individuos a proteger:</td></tr>
<tr><td>Latitud
37º35’56,5’’ S</td><td>Longitud
72º58’40,4’’ W</td><td>Altitud
849 m</td><td colspan="3">Fenología: Pocos individuos produciendo frutos, pero regenerando muy bien.</td></tr>
<tr><td colspan="3">Misceláneos:</td><td colspan="3">Misceláneos:</td></tr>
<tr><td colspan="3" rowspan="2">Descripción del sitio (aspecto, topografía, etc.)</td><td colspan="3">Vegetación asociada:
- Laurelia</td></tr>
<tr><td colspan="3">Presencia de otras especies amenazadas:
- Satureja multiflora
- Citronella mucronata</td></tr>
</table>

Nombre de la propiedad:			***Fecha***	***Componente Social***
Preocupación por sustentabilidad de actividades productivas prediales:	***Sentimiento de pertenencia a la zona:***	***Interés por conservación de especies amenazadas:*** **4. SI**		
Situación futura del predio, según propietario / grupo familiar: **5.**	6. Situación legal del predio:	***Relación con empresas forestales que posean patrimonio en sectores vecinos:***		
			Componente Económico	
Dependencia económica del predio (origen de ppales. ingresos, extra o intraprediales):	***Principales rubros de producción (agrícola, forestal y/o ganadero):***			

Nombre de la propiedad:	*Fecha*
Actividades desarrolladas en la visita; - Toma de muestras de ADN - Inventario	
Principales Amenazas: - *Cosecha de plantaciones aledañas de especies exóticas* - *Incendios forestales*	
Medidas actuales de protección: *- Zona de protección de Forestal Mininco*	
Acciones requeridas/recomendadas. *- Mantener el suministro de agua del área*	
Time Schedule: - *Realizar inventario de vegetación durante el año 2004* - *Ver la amplitud total con* Pitavia punctata *con guardabosque de Forestal Mininco.*	
Observaciones, comentarios - *Solo se muestreo una parte del área, pero aparentemente podría haber mayor numero de individuos.* - *Zona de protección de Forestal Mininco (área total de 12 há.)* - *Sitio prioritario de protección* - *Manejo cuidadoso del área local (Se debe proteger el suministro de agua)* - *Deben pedir recomendaciones antes de realizar la cosecha de las plantaciones aledañas.*	

***Appendix 3* SITES WITH SIGNED AGREEMENTS**

Pitao - Pitavia punctata

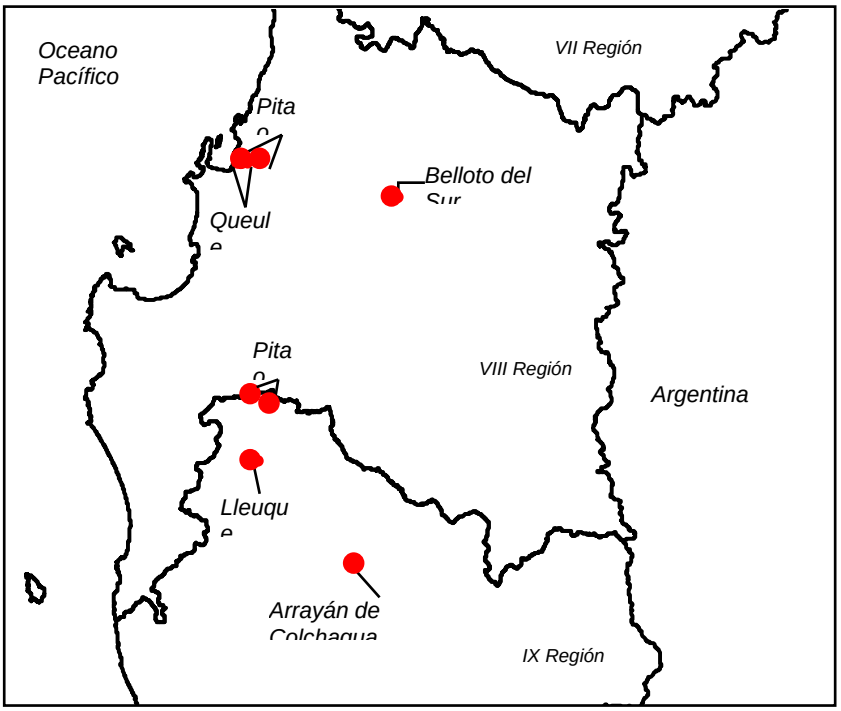
Queule – Gomortega keule

Belloto del Sur – Belschmeida berteroana

Lleuque – Prumnopits andinus

Arrayan de Colchagua – Myrceugenia colchaguensis

SITES WITH SIGNED AGREEMENTS



Appendix 4

Examples of Conservation Management Plans

The following summarised management plans are examples of project work that is aimed at the conservation and habitat restoration of particular populations of three of the most threatened southern and central Chilean woody species; Prumnopitys andina *(Podocarpaceae),* Pitavia punctata *(Rutaceae), and* Gomortega keule *(Gomortegaceae).*

All sites are located in the VII and VIII region of Chile; this is also the area with the largest commercial forest plantations in Chile and the most fragmented native forest.

The selection of each site has been based on the degree of threat, an assessment of the viability of the population and the likely success of conservation work, the known or estimated genetic variability compared to other known populations (the Pitavia populations sites were identified during laboratory work undertaken during the training programme of the Year 2 Darwin Scholar), the security of the land tenure and the degree of interest and commitment of the owner. Each site has been extensively surveyed; information such as topography, soil type, hydrology, the presence of other threatened species, characteristics of the targeted population is recorded on site assessment forms and subsequent monitoring visits are recorded on site visit forms. All information is held in the project offices at UACh. Information about the status of these populations and the progress of conservation work is regularly relayed to appropriate CONAF officials.

Each plan includes a strategy for training and/or teaching programmes for the land owners. The agreements with Forestal Mininco and Forestal Bio-Bio represent specific sections of wider agreements that have already, or will in the final year, involve project staff in providing training staff in identification, restoration, education and research on threatened native species.

Site 1

Species: Prumnopitys andina *(Poepp. Ex Endl) de Laub.*

Conservation status: *Rare*

Property name: *Stand "El Lleuque"* ***Land Owner:*** *Sr. Domingo Cifuentes*

Locality: *Cerro Pelado, Angol-Rosario road* ***Duration:*** *10 years*

General

This agreement covers in-situ conservation and restoration work on part of the only known population of P. andina *in the Coastal Mountains. The main distribution of this species is in the Andes. The 'El Lleuque' population consists of about 50 mature trees, the majority of which are on land recently converted to pine plantation or road verges managed by Forestal Arauco. This plan covers the management and protection of the mature and immature* Prumnopitys *trees that occur within managed remnant native forest on the property adjacent to the Forestal land. This area is owned by Snr Cifuentes, a small private landowner whose main income from his 100 ha property is from the sale of charcoal, firewood, vegetables and free range pig farming – the fleshy cones of the* Prumnopitys *are an important food source for fattening the pigs. The site was located during field work in Year 1 of the project.*

Major Threats

- *Animals, especially rodents and rabbits, which eat the fruits preventing regeneration.*

- *Collection of fire wood and edible fungi by the local people.*
- *Adjacent forestry plantations that increase the probability of forest fires in the dry season.*

Conservation Measures

- *In November 2003 an agreement for conservation work was signed between the owner and the project leader in Chile*
- *A fence was built around the protected area (enclosing 0.5 ha) to assist habitat restoration; enrichment planting using seedlings located in other parts of the property will be undertaken in April and May 2004*
- *Additional fencing has been built around two female individuals to prevent predation of the seed and to provide a source of seeds for propagation at the UACh nursery and at small bed near to the land owner's house.*
- *A sign has been erected on the road near the protected site describing the project activities*
- *The owner has shown a strong interest in this conservation work and is receiving training in relation to the in-situ conservation of the species.*
- *A population dynamics survey is being carried out by an undergraduate from the Universidad de Catolica de Temuco.*

Site 2

Species: Pitavia punctata *Mol.*

Conservation status: *Endangered*

Property name: *"Pitrufquén"* ***Land Owner:*** *Forestal Mininco S. A.*

Locality: *Nacimiento-Maitenrehue road* ***Duration:*** *5 years with an extension if both parties agree.*

This management plan covers conservation work on small stands of P. punctata *occurring within mandated protected zones (specific areas, generally watercourses, where Chilean law requires the preservation of native forest) within larger forestry zones. These populations have been identified as genetically distinct by the Year 2 Darwin Scholar. In 2001 extensive forest fires devastated both the plantations and the remnant native forest throughout the area. However, the* Pitavia *trees are currently re-sprouting from the burnt stumps and, given sufficient protection should recover. This site agreement forms part of a wider agreement with Forestal Mininco in which the project staff will provide training in identification, restoration, education and research on threatened native species.*

Three different Pitavia *sites have been identified on Forestal Mininco lands. Site 1 is located in a moist depression and has been subject to disturbance by livestock. Site 2 includes two small populations surrounded by new pine plantations and heavily effected by fire (see next paragraph). Site 3 is a larger, undisturbed area where natural regeneration is occurring. This range of sites with their varying levels of disturbance will enable the main ecological constraints for the conservation of this species to be identified.*

Major Threats

- *Forest fires resulting in reduction and deterioration of the habitat*
- *Grazing and wood extraction*

Conservation Measures

- *The site was first visited during field work in Year 1. In November 2003 an agreement was signed between Mininco Enterprises and UACh. The wider*

agreement also includes other nearby Pitavia populations as well as populations of other threatened species e.g. Araucaria araucana. Work at those sites involves wider habitat conservation.

- *A fence has been built around the stands to encourage regeneration, and to exclude cattle. Specific areas within the fenced areas have been designated as monitoring plots. A buffer zone has also been cleared, helping to restrict invasion by pines and providing some protection from fire.*
- *Seeds will be collected from remaining individuals to facilitate germination research at UACh and at Forestal Mininco's nursery; these will be used for enrichment plantings in the future*

Site 3

Species: Pitavia punctata. *and* Gomortega keule

Conservation status: *Endangered/Endangered*

Property name: *Quebrada Honda 1 and 2* ***Land Owner:*** *Forestal Bío-bío*

Locality: *Near the towns of Pénco and Tome* ***Duration:*** *5 years with the option of an extension*

These areas represent small fragments of native forest restricted to gullies (quebradas) surrounded by agriculture or commercial forestry. The forest in Quebrada Honda 1 is relatively intact. Gomortega *and* Pitavia *are both present, along with a mixture of evergreen species such as* Persea lingue, Laurelia sempervirens, Myrceugenia apiculata and Podocarpus salignus. *Conversley, the forest at Quebrada Honda has been highly disturbed by people, although the remaining Pitavia population is regenerating.*

Major Threats

- *Fire wood and fruits collection*
- *Grazing*

Conservation Measures

- *Control of seed collection at both sites is a priority. Forestal Bio-Bio has increased their security at the site with more regular patrols. The problems caused by over collection of the fruit of Gomortega are explained to people caught trespassing and warnings issued.*
- *Improve the quality and quantity of seedlings currently being produced by the Forestal nursery with the aim of enriching those areas where there is a lack of regeneration.*
- *The company has shown an interest in establishing a training programme developing further training relating to the identification and conservation other threatened species that occur within the Forestal's lands. This is will start in May 2004.*

Appendix 5

SMALL REPORT ON ARBORETUM ACTIVITIES

by

Paulina Hechenleitner V. (13th May 2004)

1. Specialist nursery for Chilean threatened plant species

During the two years of the Darwin Initiative Project we have had a chance to develop a specialist nursery which is fenced and includes a new shade area, two small greenhouses (one for cuttings and one for seed propagation.

The purpose of this specialist nursery is for

- *Experimentation*
- *Small-scale propagation*
- *Demonstration of propagation techniques and materials*
- *Education*

Nursery sign complete with logos

General view of the fenced area.

General view of the shade area Greenhouses.

2. New reference collections being developed

It has been decided to develop collections of important families and genera that contain threatened species and/or species which are difficult to identify. Among the collections being developed are:

- *Improvement of "Chile Central collection" and use of demonstrative labels*

- *Chilean threatened species*
- *Myrtaceae and Escallonia*
- *Alstroemeria*
- *Bromeliaceae*

3. Arboretum news

Significant germinations

Prumnopytis andina *This is a difficult species to germinate but seeds sown in September 2003 germinated in March 2004. At the moment, the treatment that showed the best results were those seed immersed sulfuric acid for 20 minutes, then 3 hours at 25ºC in an oven.*

New people being trained and working with us

- *Fernando Bustos (Forest Technique from Concepción) – since March 2004 he has been working in propagation activities at the Arboretum nursery.*

- *Carlos Zamorano (Forest Engineer)- since May 2004 Carlos has been working on* in situ *conservation activities. He his also receiving BG-BASE training.*

- *Camila Martinez (Forest Engineer student) is supporting Carlos Zamorano on* in situ *conservation activities in the field and will do some specific propagation activities at the Arboretum nursery, from June 2004. Camila will also receive training in herbarium techniques.*

Data records

Starting summer 2003. Carlos Zamorano has been data basing the living collections of summer 2004. Only last week we finished the Juan Fernandez records and now we are starting with the Darwin Initiative (DCI) records.

Shortly we will generate from BG-BASE a second draft version of the first catalogue of the Arboretum living plant collections.

Appendix 6 Related publications

Alaback, P., T.T. Veblen, C. Withlock, ***A. Lara****, T. Kitzberger & R. Villalba. (2003). Climatic and Human Influences on Fire Regimes in Temperate Forest Ecosystems in North and South America. In Bradshaw, G.A. and P.A. Marquet (eds): How Landscapes change. Human Disturbance and Ecosystem Fragmentation in the Americas: 49-87. Springer Verlag, New York.*

Allnutt, T.R., Newton, A.C.,Premoli, A.C., ***Lara, A****. (2003). Genetic variation in the threatened South American conifer* Pilgerodendron uviferum *(Cupressaceae), detected using RAPD markers. 2003. Biological Conservation 114: 245-253.*

Aravena, J.C, ***Le Quesne, C.,*** *Jimenez, H.,* ***Lara, A****. & Armesto J.J. (2003) Fire history in Central Chile: Tree-ring and modern records. In: Veblen, T.T., Baker, W., Montenegro, G., & Swetnam, T.W. Fire and Climatic Change in the Temperate Ecosystems of the Western Americas: 343-356. Springer-Verlag. New York.*

Gardner, M.F. & Lara A*. (2003). The ecology and distribution of Chilean conifers. In: R.R. Mill (Editor). The Fourth Conifer Conference.* Acta Horticultrae..

Lara, A*., Aravena, J. C., Wolodarsky, A., Cortés, M. & Fraver, S. (2003). Fire regimes and forest dynamics in the lake district in south-central Chile. In: Veblen, T.T., Baker, W., Montenegro, G., & Swetnam, T.W. Fire and Climatic Change in the Temperate Ecosystems of the Western Americas: 322-342. Springer-Verlag, New York.*

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Premoli, A.C., R. Vergara, C.P. Souto, ***A. Lara****, and A.C. Newton (2003). Lowland valleys shelter the ancient conifer* Fitzroya cupressoides *in the Central Depression of southern Chile. Journal of the Royal Society of New Zealand 33:623-631.*

Villalba, R., ***Lara, A****.,Boninsegna, J.A., Masiokas, M., Delgado, S., Aravena, J.C., Roig F:A.,Schmelter, A. Wolodarky, A. and Ripalta, (2003). A. Large-scale temperature changes across the southern Andes: 20th Century Variations in the context of the past 400 years. Climatic Change 59:177-232.*