

## **Project for the Protection of Private Lands for the Conservation of the Huemul (*Hippocamelus bisulcus*) in the Nevados de Chillan, Chile**

The project for the Protection of Private Lands for the Conservation of the Huemul forms part of a larger initiative that aims to conserve the huemul in the Nevados de Chillán of south central Chile, and is part of the Nevados de Chillán - Laguna de La Laja Biological Corridor. This is the first Chilean initiative that seeks to establish connectivity between protected areas to ensure the conservation of biodiversity over the long term. Its objective is to connect an ecotonal zone with high biodiversity and endemism, in which are concentrated plant communities typical of the humid temperate forest of the south and of the Mediterranean forest, and where one encounters the northernmost population of the huemul. Efforts to increase the protected areas in this zone are extremely important, since the public protected areas of central Chile are of insufficient size, incapable of retaining and protecting its original fauna, and cannot conserve the local biodiversity. Forming part of these conservation efforts, this project has been able to contribute scientific investigation based upon the work of a group of university students to obtain reliable information about the condition of habitat sites in the area of the Nevados de Chillán.

During this year of work on the project, a work team with great enthusiasm, commitment and collaborative spirit has been consolidated. Due to the young age of the majority of the members of the team, there exist greater possibilities and feasibility of continuity of the link between the local universities and the study area (the local community and landowners of the area).

The fieldwork team is composed of:

- Manuel Toledo (second year student of Veterinary Medicine of the Universidad de Concepción, Chillán division)
  - Karen Ardiles (fifth year student of Veterinary Medicine of the Universidad de Concepción, Chillán division)
  - Francisca Rabanal (second year student of Veterinary Medicine of the Universidad de Concepción, Chillán division)
  - Luis Eduardo Morales (second year student of Veterinary Medicine of the Universidad de Concepción, Chillán division)
  - Giuliano Gambetta (second year student of Veterinary Medicine of the Universidad de Concepción, Chillán division)
  - Alvaro Gaete (fifth year student of Veterinary Medicine of the Universidad de Concepción, Chillán division)
  - Carlos Barrientos (fifth year student of Veterinary Medicine of the Universidad de Concepción, Chillán division)
  - Nuria Torés (Thesis student in Veterinary Medicine of the Universidad Austral de Chile)
  - Cesar Águila (Thesis student of Anthropology of the Universidad Austral de Chile)
  - Varia Dellacasa (Thesis student of Veterinary Medicine of the Universidad Austral de Chile)
- Through field trips, we have completed and corrected the GIS information that CODEFF had in collaboration with the information obtained through SAG and CONAF (See Appendix 1). A data base has been created with basic information about the property owners and the local

residents. Through the thesis research of one of the team members (Cesar Águila, Anthropology student), we have been able to gain more information and gain the trust of local inhabitants of the zone, especially in the sector of Las Veguillas, where the Anthropology student lived for a period of a few months. Rachele Gould, recent university graduate and representative of TNC, together with Rodrigo López, have given strong support to our work with property owners, strengthening the connection with the project and generating valuable information about the landowners. Thanks to this effort, Gould was able to get financing to remain working in Chile for another period. By means of these efforts, a cooperation agreement was signed by CONAMA (Corporación Nacional del Medioambiente), CODEFF and TNC (The Nature Conservancy) in the Framework of the Conservation Strategy, by which a stable working group was created for Los Nevados de Chillán, as a focal group, located in the offices of CONAMA of the Eighth Region, in Concepción. Within this context, on Friday January 21 the First Round Table for the Biological Corridor of Los Nevados de Chillán was held, organized by Rachele Gould. All of the actors were invited to the table. The purpose was to gather all their opinions (whether representatives of government agencies, NGOs, the local communities, property owners, general public, etc) with respect to the topic and to discuss proposed initiatives for conservation.

In order to have a good understanding of the area where we were to work, we made various preliminary field visits to get acquainted with the local residents, landowners, and also to understand the perspectives of the local inhabitants toward the protection of land, biodiversity, and various proposals for use of the area. We obtained information on some of the characteristics of the properties (such as accessibility and condition of roads). Through these trips we learned of the various alternative activities that some local residents are undertaking for conservation, offering them support when necessary. It was possible to get to know and visit the rural school of Las Veguillas, which is located at the highest elevation of the study area. During these visits, we became acquainted with the teachers and students, and programmed activities for a second stage of the project.

To create the biological corridor, it is very important to know the condition of the habitat sites of key properties, and the most important threats to biodiversity and the huemul. For this reason, we conducted studies to obtain a base line that could give us the characteristics of these sites. Due to the fact that the majority of the team did not have sufficient field experience, we had conducted some training in the field, with the aim of setting a methodology of work, with a strong scientific basis that will ensure the reliability of the studies. The training was under the direction of the biologists of the research group of the Huemul Project (Soraya Corales and Ricardo Figueroa), an initiative financed by CODEFF and the Frankfurt Zoological Society. This research group permanently collaborates with the students, giving them technical assistance.

For the actual field work, we selected three key properties, after analyzing the existing GIS information and discussing which zones (that formed part of the biological corridor) were key habitat for the huemul and for which there was little information. In this way, we chose Fundo El Plan (of the Vallejos family), el Fundo El Baquedano and El Predio El Gato (of the Saavedra family). The first two properties we had already visited and in February we made a field trip to El Gato, a sector with current presence of the huemul, with, however, practically no field information, and which had not been visited in more than 10 years. In addition, we

worked in the area of Las Trancas, on lands of the Municipality, which despite having a high degree of human impact from tourism, still preserve some areas of old growth native forest and is a key part of the biological corridor. Currently Daniel Schultz, a forestry technician and park ranger from the United States, is working in the sector, as a volunteer of TNC who came to work on the project for a month.

As a consequence of beginning the project and disseminating information about it, various student theses have been generated:

- An analysis of the cost-effectiveness of huemul conservation in the area of the Andean highlands of the Eighth Region of central Chile. (Masters Thesis in the Economy of Natural Resources, Universidad de Concepción, Carlos Saldarriaga, Colombian).
- Analysis of the socioeconomic situation of the human communities with livestock raising in the area of the Nevados de Chillan (Anthropology Thesis, Universidad Austral de Chile, César Águila, Chilean).
- Comparative Study of *Campephilus magellanicus* in protected habitats and an area of intensive tourist use (Thesis for degree in Veterinary Medicine, Universidad Austral de Chile, Andrea Pino, Chilean).
- Diet of the culpeo fox (*Pseudalopex culpeus*) on a protected private area for the conservation of the huemul in central Chile (Thesis for degree in Veterinary Medicine, Universidad Austral de Chile, Nuria Torés, Argentine).

And we hope that many more topics for research will be generated that will contribute valuable information for the knowledge of the area.

We have attended several meetings organized by the Committee of People Affected by the Reservoir "Punilla" for the sectors of El Chacayal, El Roble, Los Mayos, El Sauce, El Chivato, Agua Fria, La Pila, Caman, La Punilla and El Principal, due to the possible inundation of inhabited lands if the reservoir is approved. In this instance we have contributed support to the local communities and have spread information about the project. In light of the fact that the financing for the project was less than we had hoped, we reached an agreement with the Forestal Celco to finance the creation and printing of a poster to explain the project which we have distributed throughout the schools of the zone, to families of the area, landowners, as well as in the city of Chillan (public agencies, University, schools).

The poster has basic information about the project, and is clear and easy to read. It includes:

- the current location of the huemuls
- historic zones with presence of huemuls
- land that form part of the biological corridor
- concrete actions to help protect the zone and biodiversity
- telephone and address of offices to give information on sightings of huemuls

The team has actively participated in technical meetings related to the topic, such as the meeting of the National Plan for the Conservation of the Huemul, of August of 2004. In addition, TNC together with CODEFF, and in collaboration with the project, created a brochure that explains the importance and significance of the creation of a Biological

Corridor in Los Nevados de Chillán, which has been distributed to most of the landowners of the zone, to the local communities, and throughout Chillan in public meetings on the project.

Before the end of this stage of the project, and taking advantage of the visit to Chile of Dr. Anthony Povilitis, a meeting will be held on April 5, 6 and 7 in the Fundo El Sauce, a protected private area of Forestal Celco. At this meeting, the research team, NGOs, representatives of government agencies, landowners, and local residents will be present. This initiative aims to strengthen the linking among the different actors to generate agreements and cooperation for mutual benefit. With all of the information generated by the permanent work and the field trips, concrete actions will be discussed that could be taken in the near term (2° stage of the project) to protect the area. The idea is that afterwards we can implement conservation activities that come out of the three days of discussion and that we resolve to reach a general agreement.

### **SURVEY SECTOR FUNDO EL PLAN**

The field survey to the fundo El Plan was made from December 14 through December 19 2004. The estate comprises 6,000 hectares in the Andean highlands of the Eighth Region and is owned by the Vallejos family.<sup>1</sup>

### **Results:**

#### **Description of Vegetation**

- ❖ We undertook a survey from base camp, in which the evidence of cattle and the impact of large fires in previous years was very obvious. The plant community of the lower middle sector was identified as secondary growth of coigue (*Nothofagus dombeyi*) and roble (*Nothofagus obliqua*), of heights of approximately 12m. These species were accompanied by lenga (*Nothofagus pumilio*) and radial (*Lomatia hirsuta*), and possessed a canopy cover varying from between 30 and 40%. The shrub layer reached a height of 3m and was composed mainly of quila (*Chusquea sp*), michay (*Berberis rotundifolia*) and rosa mosqueta (*Rosa moschata*), with a cover of 40%. The herbaceous layer was formed by coirón (*Stipa sp*), orchids (*Chloraea sp*), alstroemeria (*Alstroemeria sp*) and capachito (*Calceolaria sp*).
- ❖ In the zones of middle elevation, in spite of the fact that it is possible to see older trees, there is evidence of prior extraction of wood and a high use by cattle that persists to this day. The plant community is mainly lenga-coigue, reaching a height of 28m and a cover of 60%. The shrub layer is formed by quila, palo amarillo (*Berberis montana*), michay (*Berberis rotundifolia*) notro (*Embothrium coccineum*) and chaura (*Pernettya sp*). The height reaches up to 4m and cover is 30%. The herbaceous layer is composed of alstromerías, vinagrillo, frutilla silvestre (*Fragaria chiloensis*) and clarín principally, reaching a height of 10cm and with a cover of 35%.
- ❖ The upper elevation has very dense secondary growth of lenga with a cover of 95%, and heights of up to 5m. This is accompanied by palo amarillo and quila. There are no mature trees nor is there a herbaceous layer.

#### **Description of Birds**

During our visit to the estate, we identified birds by means of direct observation or their vocalizations with the aim of seeing the rich variety of species present in the area.

These birds are listed below:

1. Aguilucho chico (*Buteo albigula*)
2. Aguilucho común (*Buteo polyosoma*)
3. Carpinterito (*Picoides lignatus*)
4. Carpintero negro (*Campephilus magellanicus*)
5. Chucao (*Scelorchilus rubecula*)
6. chuncho (*Glaucidium nanum*)
7. Cachaña (*Elicognatus ferrugineus*)
8. Chercán (*Troglodites aedo*)
9. Chincol (*Zonotrichia capensis*)
10. Churrete (*Cinclodes patagonicus*)
11. Churrín (*Scytalopus magellanicus*)
12. Comesevo (*Setophaga ruticilla*)
13. Cometocino de gay (*Phrygilus gayi*)
14. Cóndor (*Vultur gryphus*)
15. Concón (*Strix rufipes*)
16. Colilarga (*Syrviorthorhynchus desmursii*)
17. Diuca (*Diuca diuca*)
18. Diucón (*Xolmis pyrope*)
19. Dormilona frente rojiza (*Muscisaxicola rufivertex*)
20. Dormilona cenicienta (*Muscisaxicola cinerea*)
21. Fio-fio (*Elaenia albiceps*)
22. Golondrina chilena (*Tachycineta meyeri*)
23. Golondrina dorso negro (*Pygochelidon cyanoleuca*)
24. Hued hued (*Pterotochos* sp.)
25. Jilguero común (*Carduelis barbata*)
26. Lechuza (*Tyto alba*)
27. Minero (*Geositta cunicularia*)
28. Peuquito (*Accipiter chilensis*)
29. Picaflor (*Sephanoides galeritus*)
30. Pitio (*Colaptes pitius*)
31. Rayadito (*Aphrastura spinicauda*)
32. Torcaza (*Columba araucana*)
33. Zorzal (*Turdus falcklandii*)

We also found a nest of *Buteo polyosoma*, inhabited by three individuals. We had the opportunity to observe the reproductive behavior of these birds. In addition, we found nests of various small birds, such as cometocino, chercán, and others. Other signs of the presence of birds, such as egagropilas, remains of prey, and active perches, were also collected and recorded. The area is characterized by possessing a high presence of diurnal and nocturnal raptors. Among the latter, a species of great importance is the Concón, due to its condition as indicator species, which it shares with the Magellanic woodpecker, that is also abundant in the area.

### **Other Observations**

In the middle zones we found the short tailed snake, culebra de cola corta (*Phymaturus flagelifer*). Besides finding evidence of intensive use by cattle and goats, as well as non-

native species such as hares (tracks and feces), in practically the entire area in all different parts of the property we found tracks and scat of puma (*Puma concolor*), fox (*Pseudalopex culpeus* and *P. griseus*) and pudu (*Pudu pudu*).

In the high zones near the volcano, we found scat of the vizcacha (*Lagidium viscacia*), and a high presence of matuastos (*Phymaturus flagelifer*) in the rock fields. These two species are in a critical state of conservation, with the vizcacha in Danger of Extinction in the Region of the Biobio.

### **Past uses of the Estate**

The Fundo El Plan was used for the extraction of native wood, especially lenga, and for cattle raising, and as a frontier pass for cowboys.

### **Current uses of the Estate**

Extraction of fallen logs and pasture for livestock. In spite of the evidence of human intervention (forest fires, cutting of trees and great quantities of trash) it still possess a great ecological potential, being inhabited by various indicator species with problems of conservation, and maintains characteristics that make it unique, even though it continues to be used by cowboys as passage for the herding of animals to summer range.

## **SURVEY SECTOR FUNDO EL BAQUEDANO.**

The survey of the fundo El Baquedano was undertaken between January 4 and 9 of 2005. The estate possesses a surface area of 3,000 hectares of the foothill area of the Eighth Region in the Municipality of Yungay. (See Appendix 2). As we realized in the first trip that we needed to standardize our techniques and methodologies, the first three field days were devoted to training.

### **Results:**

#### **Description of Vegetation**

- ❖ The lower zones are characterized by a forest of secondary growth of coigue (*Nothofagus dombeyi*) roble (*Nothofagus obliqua*) and raulí (*Nothofagus alpina*) of a height near 25 m accompanied by radial (*Lomatia hirsuta*), maqui (*Aristotelia chilensis*), chinchín (*Azara microphylla*) and maquicillo (*Azara intergrifolia*) with a cover of 60 % approximately. The shrub layer has a cover that varies between 30 and 40 % and reaches a height of 5m and is composed of quila (*Chusquea* sp), parrilla (*Ribes* sp), chaura (*Pernettya* sp), maitencillo (*Maytenus disticha*), pichi romero (*Sophora macrocarpa*), chilca (*Baccharis* sp.), matico (*Buddleja globosa*), retamo (*Tilene montpessulana*), yaqui (*Colletia ulicinia*), mosqueta (*Rosa moschata*), michay (*Berberis rotundifolia*), palo amarillo (*Berberis montana*), and laura (*Schinus patagonicus*). The herbaceous layer is mainly formed of coirón (*Stipa* sp.), costilla de vaca (*Blechnum chilense*), orchids (*Chloraea* sp) and alstroemeria (*Alstroemeria* sp).
- ❖ At mid elevations the plant communities change to roble-coigue with heights approaching 15m and a cover of 40% and the species associated are la leña dura (*Maytenus magellanica*), el notro and some examples of ciprés de la cordillera (*Austrocedrus chilensis*). The shrub layer adds ñipa (*Escallonia alpina*), lilén de cordillera (*Azara alpina*), radial enano (*Orites myrtoidea*) and mayú (*Sophora*

*macrocarpa*). To the herbaceous layer is added valeriana (*Valeriana macrorhiza*), chagual (*Puya berteroniana*) capachito canoso (*Calceolaria cana*), chupón (*Greigia sp*), some species of senecios (*Senecio spp*), sisi (*Synsirinchiium sp*), eufrasia blanca (*Euphrasia flavicans*), clavel del campo (*Mutisia decurrens* and *Mutisia sp*) and Andean fern (*Polistichum andinum*).

- ❖ In the high elevation, the tree layer is characterized by the almost exclusive presence of dwarf lenga (*Nothofagus pumilio*), the shrub layer is composed of notro, lilén de cordillera, radial enano, chaura, maitencillo, pichi romero and chilca. The herbaceous layer is composed of coirón, orquídeas, valeriana, capachito canoso, chupón, some species of senecios, sisi and eufrasia.

On the ridge we observed extensive patches of paramela (*Adesmia emarginata*).

### Description of Birds

With the aim of making a preliminary study of the biodiversity of bird species existing in the fundo Baquedano (Municipality of Yungay), between the days of 7 and 9 of January 2005 we conducted 5 censuses along a transect of approximately 2,000m, with ten observation points. The record of species was made by direct visual observation with the aid of binoculars (8 x 25) as well as by the recognition of the vocalization of the birds.

Table 1: Species and quantity of birds recorded in 5 censuses undertaken in the Fundo Baquedano.

Date and time of census and Species	7 Janu ary8 AM	7 Janu ary7 PM	8 Janu ary 8 AM	8 Janu ary 7 PM	9 Janu ary8 AM	Total
Aguilucho				1		1
Cachudito ( <i>Anairetes parulus</i> )	3	2	6	3	3	17
Canastero ( <i>Asthenes humicola</i> )				2	3	5
Carpinterito				2		2
Carpintero				2		2
Chercán	15	21	18	16	14	84
Chincol	23	18	17	14	17	89
Chirihue ( <i>Sicalis luteiventris</i> )			1			1
Chucao	24	19	26	18	19	106
Churrete	1		1		3	5
Churrin	4	12	11	4	13	44
Codorníz ( <i>Callipepla californica</i> )	2		6		5	13
Comesevo	5	3	4		4	16

Cometocino	6		4		3	13
Diuca	7		2	1	2	12
Diucon	2	11	2	2	2	19
FioFio	14	12	19	14	31	90
Golondrina chilena		19	2	16	1	38
Golondrina dorso negro	4	15	12	21		52
HuedHued			1	2		3
Jilguero	4	5	10	3	7	29
Picaflor	3	5	3	2	6	19
Pitio	7	4	8	10	1	30
Rara ( <i>Phytotoma rara</i> )				1		1
Rayadito	12	12	19	2	16	61
Tordo ( <i>Curaeus curaeus</i> )		1	12	3	3	19
Zorzal	3	4	1	6	1	15
Total	139	163	185	145	154	<b>786</b>

In addition, we recorded all those birds which we observed or heard at times outside of the formal censuses, such as the case of the nocturnal raptors (Table 2). In all, we recorded more than 28 species of birds.

Table 2. List of birds record beyond the census.

Colilarga
Concon
Gallina ciega ( <i>Caprimulgus longirostris bifasciatus</i> )
Lechuza
Minero
Turca
Tórtola

### Description of Mammals

In order to verify the presence of mammals we defined a transect of 2,000m. approximately, in which we installed smelling stations for carnivores (canines and felines). At the second station (see appendix: way point 219), on the second day of setting traps, we found tracks of a fox. Unfortunately for problems of climatic conditions, the permanence of the smelling stations was restricted to three days, and could be the reason for the low visitation of these sites, in addition to the action of the cattle, which on occasion interfered by destroying the smelling station.

At different parts of the estate, we observed tracks and scat of felines, such as puma (*Puma concolor*), colo colo (*Lynchailurus colocolo*) and guiña (*Oncifelis guiña*). All of these species are considered to be Vulnerable in terms of conservation status.

Upon exploring the high zones, we observed directly a vizcacha (*Lagidium viscacia*), with the entire team being able to see it for a long time.

#### **Other observations**

In the estate we found a short tailed snake, culebra de cola corta (*Phymaturus flagelifer*). There is a high presence of cattle in the valley.

#### **Past uses of the estate**

The Fundo El Baqueano was used for the extraction of native wood, especially coigue for the construction of barns.

#### **Current uses of the estate**

The extraction of wood is still occurring, but what most impacts the habitat is the presence in the valley of the road for the oil pipeline, which was constructed between 1993 and 1995, and now is in permanent use.

## APPENDIX 1

Table of Contact with property owners

Property Name and Size	Owner	Opinion of landowner	Status of huemuls in property
Fundo Las Veguillas (approximately 4,500 ha)	Rafael Sepúlveda and Eduardo Sepúlveda	Great interest in conservation and soon will sign a protocol of cooperation with CODEFF, one of whose aims is the undertaking of a management plan for the estate.	There is presence of huemuls in the sector.
Fundo El Plan (aprox. 7,500 ha).	Vallejos Family	Owner recently died; 8 heirs have differing attitudes toward the property. Many want to sell.	While permanent huemul presence has not been detected for a number of years, the property is a key connective property for the long-term biological continuity and connectivity of the two main huemul populations in the area.
Fundo Alico (aprox. 3,000 ha).	Adriando Sepulveda Clarkson, Olga Sepúlveda Clarkson and Isabel Sepúlveda Clarkson.	Great interest in conservation and in undertaking activities of ecotourism on their properties. Currently ready to become part of the network of protected private properties (RAPP) which is promoted by CODEFF.	There is presence of huemuls in the sector.
Fundo Valle Chico and Santa Gertrudis (8.000 ha).	Rodrigo and Militza Saavedra.	Interest in implementing a management plan for the estate, but it is one of the properties with the most number of goats.	There is presence of huemul in the sector.
Fundo San Jose (aprox. 2.000 ha).	Owners: Construction Development Corporation in	Willing to develop a management plan for economic activities (tourism) and conservation.	The property is directly adjacent to CODEFF's Reserve; it is logical expansion range for the existing population.

		which Jose Luis Giner participates (Termas de Chillan resort).		
Fundo Peruco. (2.000 hecets).		Molina Family.	Great interst in conservation and in managment of the estate. Member of RAPP for more than 8 years.	Huemuls were present five years ago; a current study has not been made.
Fundo El Roble (4.000 hecets).		Owners: Cox family.	Formal contact has not yet been made with this family, but here there is concentrated a great quantity of cattle and goats on summer range.	There are huemuls and the estate borders the National Reserve Ñuble.
Fundo Sociedad Anónima Araucaria (19,000 ha).		A real estate corporation from Santiago, with about 20 members.	Have great interest in territorial management for activities of conservation and tourism. Has made much contact with CONAMA, TNC and CODEFF. With CODEFF has applied to the fund of the CONAMA for conservation of biodiversity and the university student group of Diane Haughney (Bates College, USA) will support the efforts to generate base line studies for the plan.	While huemuls have not been detected here recently, it is a possible connective property between the Nuble Reserve and the Laguna del Laja park.
Fundo Baquedano (3,000 ha).	El	Private Individual	Our contact with this property has been through CONAF; we are attempting contact with the owner.	Huemul presence was detected here in September 2004; this led to the field visit in January by the BP team.

## **APPENDIX 2 (Archive attached with GPS points)**

### **Explanation of Way points**

- 215 Base camp
- 216 First characterization of forest
- 217 Sighting of vizcacha
- 218 Smelling station 1 collection of reptiles
- 219 Smelling station 2
- 220 Smelling station 3
- 221 Smelling station 4
- 227 Smelling station 5
- 222 Smelling station 6
- 223 Smelling station 7
- 224 Smelling station 8
- 225 Smelling station 9
- 226 Smelling station 10
- 228 Collection of reptiles
- 229 Collection of reptiles
- 230 River crab (next to campsite)
- 231 Native forest
- 232 Native forest
- 233 Native forest