The Gondwana proposal: Transboundary conservation advocacy in southern Chile and Argentina

Gary Graham Hughes
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The Gondwana Proposal: Transboundary Conservation Advocacy in Southern Chile and Argentina

By

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1-2-02

Date
The Gondwana Proposal: Transboundary Conservation Advocacy in Southern Chile and Argentina

Dr. Len Broberg, Committee Chair.

Several international environmental and conservation organizations have campaigned in support of the creation of an "international system of parks and reserves" in order to protect the southern temperate forests of Chile, Argentina, New Zealand, and Australia. This proposal is known as the Gondwana Forests Sanctuary. Proponents are often times hard pressed to effectively describe exactly what the "sanctuary" is, what it would entail, and how to make it happen. This paper uses the Gondwana vision for an international parks system as a vehicle to examine issues and context surrounding transboundary conservation potential in southern Chile and Argentina.

Theories of interdisciplinary studies, sustainability, and reserve system design are the heart of this study, providing structure for the investigation of transboundary conservation in southern South America. Naïve and inaccurate uses of terms in the original proposal are approached; in dispelling the ambiguity of the original Gondwana Forests Sanctuary vision, this paper provides a solid base for upcoming transboundary conservation efforts. For instance, future GIS mapping efforts will be positively influenced by the information presented in this paper.

Due to the dynamic of North American involvement with conservation in South America, this paper does not intend to draw up a final transboundary reserve system proposal. Through examining the ecological and socio-economic context in which a regional scale conservation plan would take place, suggestions are made in order to reinvigorate the Gondwana Proposal. Further research into the use of focal species strategies for reserve system design is suggested, in order to provide ecological strength to a regional scale proposal. Ideas about an "international treaty" establishing the sanctuary are naïve considering the current state of international environmental diplomacy. There may exist channels for conservation in an existing bi-national agreement between Chile and Argentina. The expansion of buffering strategies focusing on transnational players attempting to develop destructive megaprojects in the region is an important element of conservation advocacy. Ongoing maintenance of a transboundary advocacy network, concentrated on involving participants in the two neighboring countries, is essential in designing a practical regional scale conservation plan for the southern temperate forests of Chile and Argentina.
### TABLE OF CONTENTS

Abstract............................................................................................................................ii  
Table of Contents...........................................................................................................iii  
List of Tables and Maps................................................................................................v  

**Section I. Opening**

Chapter 1. The Andean Roots of International Forest Protection.........................1

**Section II. Methodology**

Chapter 2. The Interdisciplinary Hypothesis for Sustainability and Biodiversity Conservation.................................................................................................................................9  
  Global Environmental Change and the Impetus for Immediate Action.......9  
  Sustainability and the Interdisciplinary Hypothesis.................................12  
  Interdisciplinary Studies and Considerations in the Design of Reserve Systems.................................................................16

**Section III. Results and Discussion**

Chapter 3. Scientific Considerations in the Design of a Transboundary Reserve System in Southern South America.................................................................21  
  The Temperate Forests of Chile and Argentina: A Biogeographical Island.................................................................24  
  Characterization and Description of South America’s Temperate Forests....28  
  The Huemul: Transboundary Conservation Planning with Focal Species...32  

Chapter 4. The Administrative-Legal Framework of Forest Protection in Argentina and Chile.........................................................................43  
  Privatization, Unfulfilled Representation, and Parks Without Enacted Legislation: Global Treasures at Administrative Risk in Chile.........45
LIST OF TABLES AND MAPS

TABLE ONE: NGO adherents to the Santuario Internacional de Bosques Sub-Antarcticos, Gondwana Forests Sanctuary .................................................................3

TABLE TWO: The “conceptual space” of Sustainability ..................................................14

TABLE THREE: A Sample SUITE OF SPECIES ..........................................................41

TABLE FOUR: The Southern Cone and International Environmental Diplomacy .................................................................71

TABLE FIVE: Meeting the Challenges of Sustainability .........................................93

Overview Map in Pocket
Section I. Opening

Chapter 1.

The Andean Roots of International Forest Protection.

During the austral autumn of April 1998, representatives of environmental non-governmental organizations from countries throughout the Americas and the southern hemisphere gathered at a home in the Andean foothills behind Santiago de Chile for the first meetings promoting the concept of the International Gondwana Forests Sanctuary. The backdrop to the international grassroots gathering of organizations and individuals interested in the conservation of the southern temperate forests was the second Summit of the Americas. The Summits of the Americas are the Presidential level meetings of all the nations of the Americas, save Cuba, dedicated to the establishment of the Free Trade Area of the Americas (FTAA). The FTAA is the name given to the process of expanding the North American Free Trade Agreement to all the other nations of the Americas, apart from Cuba (Barlow 2001). This project would link the economies of the hemisphere and concurrently deepen social and political integration among the participating countries (Barlow 2001).

As the Summit of the Americas was called to order in April 1998, a civil society forum and meeting of the Summit of the People of the Americas convened to discuss the threats that a hemisphere wide free trade agreement presents to natural and human communities alike. While upper level diplomats conferred in luxury apartments and secured conference centers, labor organizers, indigenous leaders, conservationists, and fair trade advocates from the far corners of the American continents met in working groups in a hotel in downtown Santiago to design a cautionary and alternative response to the free trade agenda.

Understanding the trend towards hemispheric integration was a thread consistent throughout the various working groups of the Peoples Summit. The goal of the working groups was to come up with recommendations to make to the
governments participating in the negotiations of the FTAA. Among those recommendations were those of the forests working group that, due to the complexity and value of the biodiversity contained in forests, “the conservation of forests should be a prioritized objective of a true process of hemispheric integration” (RENACE 1998). Efforts to achieve this objective would necessitate institutional reform that facilitates public participation, eliminates environmentally and socially damaging government subsidies to industry, and a reexamination of the erroneous supposition that commercial liberalization and development automatically has beneficial impacts on people and the environment (RENACE 1998).

Also at question was the perception of the process of the FTAA negotiations as being fundamentally incompatible with the principles and criteria of sustainable development (RENACE 1998). This position was reinforced immediately by the abandonment of goals considering sustainable development by FTAA negotiators, contrary to what had been discussed at the first Earth Summit in Rio in 1992 and at the Inter-American Committee on Sustainable Development meetings in Santa Cruz, Bolivia in 1996 (Barlow 2001, RENACE 1998). Compounded by the lack of access for civil society to FTAA documents and negotiations compared with the ease of access for transnational players such as industry associations and corporations, this abandonment of even rhetorical stances considering sustainability lead participants in the Peoples Summit to develop a Citizens Agenda (RENACE 1998). The Citizens Agenda boldly proposed the establishment of international and interdisciplinary alliances, the mobilization of hemispheric society to resist the FTAA, and the elaboration of an alternative vision of hemispheric integration based on the original principles of sustainable development (RENACE 1998).

At the center of the first Gondwana Forests Sanctuary meetings was the anticipation of the need to begin wholeheartedly investigating the possibilities of alternative proposals that would substitute or at least mitigate the free trade paradigm. The meetings took place in the Chilean capital of Santiago, and in Pucon, a small tourist center near the Villarica volcano in Southern Chile. The
original vision of the meeting participants was to "form an international alliance of non-governmental organizations to help establish a Southern Hemisphere Gondwana Forest Reserve System, a system of parks and reserves for all temperate forests south of Parallel 40 degrees in Chile, Argentina, New Zealand, and Australia. We propose that by international treaty, a Gondwana Forests Sanctuary is created to reunite these forests, preserving all the primary forests in parks and allowing only sustainable uses in secondary forests of public reserves and private lands" (Langman 1998).

<table>
<thead>
<tr>
<th>TABLE ONE: NGO adherents to the Santuario Internacional de Bosques Sub-Antarcticos, Gondwana Forests Sanctuary</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Argentina:</strong> Proyecto Lemu, Grupo Ecologico de Corcovado, Fundacion Shoam Hue, Sociedad Ecologica Regional, Associacion Ornitologica del Puelo, Vuquipura Mapu, Associacion Lihue, Comunidad de la cuenca del Nahuel Huapi, Huala, Associacion Huemules, Fundacion Patagonia Natural, Sistemas Ecologicos Patagonicos, Movimiento Anti-nuclear del Chubut, Fundacion Despertar, Fundacion Peninsula Rauli, Finis Terrae, Campana Solidaria por los Bosques de Tierra del Fuego, and Greenpeace Argentina.</td>
</tr>
<tr>
<td><strong>Chile:</strong> Defensores del Bosque Chileno, GeoAustral, Fundacion Lahuen, Alianza por los Bosques de Chile, and Proyecto Pumalin.</td>
</tr>
<tr>
<td><strong>USA/Australia/New Zealand:</strong> Native Forest Network, American Lands Alliance, Foundation for Deep Ecology, Ashoka, Rainforest Information Center, and Ancient Forest International.</td>
</tr>
<tr>
<td>Source: Proyecto Lemu publication Hoja por Hoja No. 7, Jan 2002.</td>
</tr>
</tbody>
</table>

Accompanying this vision calling for an international system of parks and reserves was an intention to use the growing alliance of NGO’s to confront the resource extraction mega-projects of major transnational corporations. This objective was based on the assessment that forestry and natural resource export based mega-projects present a major threat to the integrity of the southern...
temperate ecosystems. This type of buffering strategy campaign, further
described in Chapter 5, is shown by this paper to be an important part of regional
scale reserve system advocacy. Corporate campaigns such as those focused on
Boise Cascade, Trillium/Savia, and Noranda, Inc., all of whom have been or are
presently involved in major industrial investments in the temperate forests
ecosystems of Chile, have been the Gondwanic staple of North American support
of the Chilean environmental groups, the majority of which are not actually
actively engaged in promoting the Gondwana Forests Sanctuary. As a matter of
fact, there are far more organizations interested in and readily participating in the
Gondwana vision in Argentina than there are in Chile. Unfortunately, there are so
many threats, so many crises, and so many “fires to be put out,” that very little
progress has been made on building an inclusive regional network, identifying
effective transboundary legal strategies, and articulating a concrete transboundary
conservation planning proposal under the Gondwana umbrella. A major
corporate campaign in North America may get press, but a practical regional
reserve system proposal demands more mundane and on the ground conservation
research and work. This paper tries to shed light on how these divergent
approaches can be integrated.

Many concepts included in the original Gondwana Forests Sanctuary
statements such as those of “sustainable development,” “international treaties,”
and “reserve systems,” can be used in a casual and inaccurate manner. As well,
assumptions have been made about institutions identified to support the
Gondwana proposal, such as the United States Agency for International
Development or the United Nations. There has been inaccurate and confusing use
of these terms in some of the campaign rhetoric associated with the Gondwana
umbrella. For instance, the use of the word “sanctuary” has been one of
confusion, in that a reserve system, while offering high levels of protection to
core habitat, does not intend to make the entire regional landscape inviolable.
Terms like “world park” and “reserve system” are included in various
descriptions of the Gondwana Forests Sanctuary vision, without really framing
the concepts. This paper provides definitions and information that will put
meaning behind the use of such terms, hopefully providing tools with which a broader advocacy network can affect a regional scale congruency of objectives in methodologically distinct conservation efforts.

To be effective, terms need to be articulately defined and their practicalities determined. Concepts of sustainability, multi-lateral environmental agreements, and reserve systems are critically examined in this paper as a means of providing a well-researched grounding in their use and applications. The review of these terms, especially that of regional scale reserve systems, provides the methodological structure for the investigation pursued in this paper. The review and synthesis of this information will help identify potential courses of action that support a truly sustainable mode of regional and hemispheric integration, whether the reader wants to “adhere” to the Gondwana Proposal or not. This paper can be considered an attempt at reaffirming visionary concepts and brave ideas in an age of severe environmental and social crisis, while also dispelling naïve preconceptions of how an international conservation strategy is to be implemented, or how easy it might be to realize such an endeavor.

The Gondwana vision was birthed in the creation of the Whale Sanctuary now existing south of the 40th parallel. It took more than 30 years to successfully designate the international whale sanctuary, and it is still under threat by recalcitrant members of the international community. To make a regional scale reserve system in southern South America a reality may easily take as long. This paper is not a finalized proposal—as a North American contribution to South American conservation this paper is largely intended to assess and suggest, with a large margin for appropriate adaptation. It is an extension of efforts associated with the community entertaining the Gondwana proposal that is intended to support sincere conservation efforts throughout the region, regardless of affiliation.

Importantly, much of the vision that inspired the original conservation concept of the Gondwana Forests Sanctuary comes from a community of people that have been involved on an international level of envisioning a “wildlands project” type regional solution to the land management and international
economic issues that are threatening the southern native forests. A challenge for individuals and organizations in Chile and Argentina has been to overcome cultural, geographical, and political barriers to work together in composing an articulate and realistic regional scale conservation proposal. In either country "wildlands" style advances have been made—the Ecoregional Corridor in the Argentinean Andes originally proposed by Proyecto Lemu being a prime example (see Chapter 4). Yet little has been done to effectively take advantage of and nurture the interest that exists in working across the border with colleagues in the neighboring country. Much of this is due simply to the lack of financial resources and the constant crisis like context of environmental work in southern South America. Much of the North American and international support tends to ignore the transboundary context as well, focusing more on Chile than on Argentina—though that situation has changed recently in terms of conservation oriented land acquisition. This paper will conclude that more than anything, the regional scale planning for the conservation of biodiversity envisioned in a Gondwana type proposal needs a consistent investment in a well-connected transboundary advocacy network (Chester 1999), whether it is called Gondwana or not.

This paper is a contribution to this network as a means of transferring the ideas of a reserve system closer to actual application on the ground. This practical quality makes “Gondwana” more than a romantic rallying cry and sound bite for rainforest activists. There is a healthy body of international and interdisciplinary literature that is drawn upon in this paper, which provides a substantial argument for the effective potential of transboundary conservation advocacy and planning in the temperate forests of the Southern Andes. It is this intellectual, academic, and professional foundation that the Gondwana vision has been lacking. Spirit, passion, hope, and the courage to take on major transnational corporations have been present from the beginning; what has been missing is useful research that leads to the consideration and implementation of practical strategies for regional scale conservation. Having stronger information to back up the proposal will increase the probability that other organizations and
conservation professionals will consider the idea seriously, and start making their own key contributions.

A functional reserve system proposal needs a professional conservation and community oriented mapping component. This is an objective pursued since the very inception of the Gondwana Forests Sanctuary campaigning, but still unattained. A renewed focus on transboundary mapping is suggested by this paper as an obvious strategy; this paper will help identify mapping subjects, especially around the focal species strategies elaborated upon in Chapter 3. Many GIS efforts in Chile have been wrought with difficulties and challenging political and organizational dynamics. In Chile and Argentina, there is widespread skepticism about the efficacy of mapping. The fact that many of the mapping objectives outlined in the original Gondwana Forests Sanctuary meetings have not been achieved is a glaring failure of the campaign at this juncture. Without detailed maps, this text is weaker than it would be with maps. Nevertheless, being grounded in natural science, social and economic awareness, and international environmental diplomatic realities, this paper provides information as a sort of introductory manual to transboundary conservation in the region. Respectfully, the document shies away from making a final detailed proposal. Information is still lacking, and this writer is not a North American who would say, “this is how it should be done.”

The intellectual essence of this paper is based on the concepts of core habitat, connectivity, and buffering strategies. Regional scale planning that prioritizes the conservation of biodiversity will cultivate ecological connectivity between core areas, operational connectivity between social and natural scientists desiring effective planning, political connectivity between consumers and the environmental source and costs of many products, and philosophic connectivity between all of those who want to participate in a just and ecologically sustainable America.

The tenuous nature of under funded biodiversity advocates running personal and professional risks in organizing against the destruction of nature by transnational corporate interests has stretched the limits of the original Gondwana
network. Dissolution of this network, either purposefully or through attrition, would be a disservice to the natural and human wonders of the region. The Gondwana Proposal as speculated upon in this paper is an idealistic alternative to current global trends of ecological and cultural degradation. Some of the wildest and most intact natural places on the planet are still to be found in Chilean and Argentine Patagonia. This paper is a contribution to an international grassroots effort to help keep them that way. Hopefully readers will be motivated to join the Gondwanista community.
Section II. Methodology

Chapter 2

The Interdisciplinary Hypothesis for Sustainability and Biodiversity Conservation

This chapter is dedicated to describing the methodology of analyzing and addressing reserve system design and transboundary conservation issues that has been pursued in the development of this project. A detailed description of the techniques being applied in this study is meant to demonstrate that this methodology can be applied, with contextual adaptations, nearly anywhere there is interest in promoting a reserve system for regional and/or transboundary conservation planning. Above all else these tactics of study and investigation are solid tools to add to the toolbox of analysis.

Much of the information presented here is somewhat generic, coming from North America and other places far removed from “Gondwana.” Some of the ideas and definitions are directly from Chile and Latin America. The general purpose is to present the methodology used in synthesizing the information included in this study in such a manner that the structure is clear, possesses repeatability, and could be easily applied in other situations and geographical contexts.

Global Environmental Change and the Impetus for Innovative Action

Due to their complex nature and varieties in scale, it is impossible to know everything there is to know about natural systems and their components, leaving a particular uncertainty about nature. The lack of a scientific consensus on how to interpret much of the information that is generated from scientific studies also presents difficulties, and is a verifiable source of tremendous uncertainty as to what is actually happening with our planet’s natural systems. Stepping outside the limits of training, professional societies, and reward systems also can generate
uncertainty for social and natural scientists. Nevertheless, coming to terms with uncertainty is a positive step for scientists and planners, because it encourages thinking that moves beyond the “illusion” that science and technology will provide the ultimate solution to environmental and resource problems (Ludwig et al. 1993).

It is generally understood by natural scientists that the degradation of the Earth’s environment poses hazards to human health and life, and even puts at risk all life on this planet (Ludwig et al. 1993). The certainty with which we must act in developing appropriate research, conservation policies, and social planning in terms of these risks is in understanding and communicating that humans and their activities are the primary agents of global environmental change (Vitousek 1994).

There is evidence that the loss of biodiversity, compared to other elements of global environmental change such as changes in the carbon or nutrient cycles, will necessitate at least a several million-year recuperation, if such a recovery is at all possible (Vitousek 1994). Biodiversity is being irreversibly depleted, as it is not a resource that can simply be replaced (Wood 2000). The biodiversity crisis is the most crucial of all the issues facing human kind and the planet today due to the absolutely irrevocable essence of extinction. The world’s political and civil society leaders have been attempting to address environmental degradation for several decades. Exactly 10 years after the first Earth Summit in Rio de Janeiro, Brazil, the World Summit on Sustainable Development recently occurred in Johannesburg, South Africa. At the forefront of global politics and culture are the pressing issues of what can be done about environmental degradation and the interrelated questions of human communities, social and economic equity, and planetary natural resource use.

This is the same question of “what can be done?” that was asked in Rio. Surprisingly enough, some of the answers are the same as they were ten years ago, still waiting for a full investigation and a thorough commitment to implementation. It has been widely accepted that the basic notions of sustainability, as proposed in literature and conferences even before the realization of the Rio Earth Summit, do contain numerous unifying themes that
could serve for developing integrated conservation strategies around the world (Olembo 1989). These themes, such as promoting conservation through economic development in rural communities, have generated tremendous controversy as to their ultimate manipulation, their efficacy in actually protecting the natural world, and the practical and successful implementation of projects birthed in this philosophy. The professional efforts encouraging private, national, and international institutions to implement these concepts of sustainability have been and continue to be immense, with little or no action from many national and multi-national stakeholders.

Professional conservation biologists, participating in what is sometimes referred to as a “crisis discipline,” have dedicated their careers to integrating various scientific and management disciplines in order to respond to the “extinction crisis” (Primack 2000). Many of the actions that have been promoted as necessary steps to maintain and conserve biodiversity are quietly congruent with concepts engrained in perspectives shared at meetings such as the Earth Summits in Rio and Johannesburg. Stabilizing human populations, developing both local and global sustainable economies, gaining a global perspective on the Earth’s resources and environmental challenges, and even changing human value systems to reflect the realities of living on a finite planet have all been proposed as essential actions to protect the biodiversity of the globe (Meffe and Carroll 1994). For effectiveness, it is important to maintain a perspective on the issues of scale between global, regional, and local action. These proposals for action and a response to the changes in global environmental integrity are generally regarded as essential in future social, economical, and environmental planning if biological diversity is to be conserved and protected (Western et al. 1989, Noss and Cooperrider 1994, Primack 2000).

At the bottom of this attempt to create practical responses to an ecological crisis is the realistic perspective that the conservation of biodiversity is a political issue (Brandon et al. 1998). There is an imperative now for natural scientists to begin collaborating more eagerly with other disciplines, especially those disciplines enmeshed in the political sphere, in order to effectively advocate
politically for the conservation of biodiversity (Vitousek 1994). Any agenda designed to address human resource use and the concurrent potential degradation of the natural environment has to address the political realities of such resource use, especially when resources become scarce or are not distributed in equitable manners (Western et al. 1989).

The political characteristics of conservation advocacy are clearly understood by many natural scientists around the world. A trio of renowned Chilean ecologists wrote of the Chilean temperate forest that “only politics of development that consider an ecological base will be able to succeed in reverting the growing degradation of the native forest ecosystems” (Armesto et al. 1994).

Yet, even with examples of how disciplines are reaching out to each other in an effort to respond together to the biodiversity crisis, conservationists frequently ignore the socio-political realities of globalized industrial society. In fact, “conservationists are often not seen as problem solvers reflecting people’s basic desires and values—they too often do not recognize issues of disparity of wealth and power as relevant to the conservation issue” (Western et al. 1989). These issues of inequality are at the heart of any effort towards conservation and the creation of sustainability. It is important for natural scientists to broaden their horizons as to the social and political complexity of the extinction crisis.

Sustainability and the Interdisciplinary Hypothesis

The terms “sustainability” and “sustainable” have been used in so many contexts that their definitions require clarification. A discussion of the concept of sustainability reveals the need for a rigorous definition of the term, in order that strategies cloaked in rhetoric of sustainability are held to strict standards that increase chances for conservation success. Sustainability as a concept has been bandied about for many decades; there is little evidence that such claims are trustworthy (Ludwig et al. 1993). The term “sustainable development” is especially suspect when the conservation of biodiversity is involved (Willers 1994). Nevertheless, by abandoning the social concepts and goals of
sustainability, conservation efforts appear to not contribute to the solving of problems (Western et al. 1989). By outlining a rigorous definition it is possible to give substance to the term “sustainability,” and provide insight as how to achieve it through interdisciplinary collaboration.

Definitions of the term do vary. A pair can be elaborated on here. One definition, whereby “sustainability is the maintenance of a level of biological diversity that guarantees the resilience of ecosystems in order to sustain human life over the long term” (Calcagni et al. 1999), demonstrates again the ecological and human survival imperative for action to attain this goal, yet it still resounds with a degree of social ambiguity. Another definition attempts to come to a more practical definition of the “conceptual space” of sustainability. Chilean biologist and environmental ethicist Ricardo Rozzi writes with Max Oelshlaeger (1998) that a minimum of six variables is necessary to understand the term. It is the dynamic interaction among these variables and the disciplines that accompany them that will define sustainability in practice. These variables are ecological integrity, economic sufficiency, appropriate technology, social justice, human dignity, and participatory decision-making (Oelshlaeger and Rozzi 1998).

This is a strict definition of sustainability that is appropriate for an interdisciplinary approach to conservation planning. A strict definition assists as well in debunking “greenwash” rhetoric common now in industrial scale resource extraction. Table Two explores these variables further (see page 14). The high standards of the definition will assist in understanding the original objectives of sustainability.

As with “sustainability,” there have been endless references to “interdisciplinary” assessments, or “interdisciplinary” solutions. It is important to clarify the term here. On the strict conservation front, the integration of social, political, and conservation disciplines is perceived as essential for the long-term protection of national parks and nature reserves everywhere in Latin America, many of which are on the verge of losing characteristics of ecological integrity (Brandon et al. 1998). A “triangle” of disciplines, whereby the ecological, the social, and the economic must all be considered, has been described as
indispensable to “sustainable development” (Borregaard 1997). Interdisciplinary action is also seen as a necessity for scientists to “get connected” with other colleagues (Vitousek 1994).

**TABLE TWO: The “conceptual space” of Sustainability**

Sustainability depends on the dynamic interaction of the following elements and variables. Any claims to sustainability or sustainable development that do not address and integrate these variables are immediately suspect.

<table>
<thead>
<tr>
<th>Variables of sustainability</th>
<th>Definitions of terms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ecological Integrity</td>
<td>Intact ecosystems that retain all working components, systems and interactions, often times dependent on protection of core reserve areas to maintain historic composition and structure of ecosystem.</td>
</tr>
<tr>
<td>Appropriate Technology</td>
<td>The pursuit of skills, knowledge, expertise, and tools appropriate to the maintenance of integrity and needs in community and ecosystems.</td>
</tr>
<tr>
<td>Social Justice</td>
<td>The establishment of fairness and impartiality in the honest distribution of social and natural goods and capital in order to maintain community integrity.</td>
</tr>
<tr>
<td>Human Dignity</td>
<td>A way of life that provides avenues towards the realization of self-respect and a positive self-esteem for all members of the human community, including respecting diversity in cultural and religious heritage.</td>
</tr>
<tr>
<td>Economic Sufficiency</td>
<td>The capability for an adequate and competent means of producing, distributing, and consuming goods and services that is satisfactory for human society and natural systems.</td>
</tr>
<tr>
<td>Participatory Decision-Making</td>
<td>Equal access to information and debate about crucial micro and macro scale policy decisions, emphasizing the democratic theme of the absence of hereditary or arbitrary class distinctions or privileges.</td>
</tr>
</tbody>
</table>
The merging of a rigorous definition of sustainability with a framework of interdisciplinary studies provides insight into what is known as the Interdisciplinary Hypothesis: the premise that a sustainable way of life requires interdisciplinary modes of identifying problems, analysis, investigation, formulation of policy, implementation and administration (Oelshlaeger and Rozzi 1998). Building on the variables of sustainability (which are ecological integrity, economic sufficiency, appropriate technology, social justice, human dignity, and participatory decision-making), this approach to conservation lends itself to developing new collaborations and a new politics. Broad interdisciplinary investigation assists in identifying innovative solutions that encourage people to “think outside the box.” By integrating insight and concepts from different disciplines, conservation strategies can avoid proposing actions that might actually defeat sustainability in another field. The Interdisciplinary Hypothesis is a useful blend of many disciplines and an applicable theory about the characteristics of sustainability, and is therefore a cornerstone of the philosophy and methodology underlying this paper.

In terms of the preservation of biodiversity, which is of paramount importance among all the issues facing humankind today, the interdisciplinary field of conservation biology helps define the different disciplines involved and how they can work together. The professional practice of conservation biology comes with certain ethical premises that summarize objectives of this multi-disciplinary field. These premises will direct people to think creatively about investigative approaches and practical applications to the conservation of biodiversity. These ethical premises of conservation biology include ideas such as the importance of preserving the diversity of species, the importance of the maintenance of ecological complexity, and the continuation of evolution (Primack 2000). Conservation biology includes disciplines as diverse as genetics, natural resources management, applied forestry, the evaluation and assessment of environmental risks and impacts, environmental ethics, environmental law, island biogeography, veterinary medicine, wildlife biology, social sciences, environmental history, and sociobiology, to name a few (Oelschlaeger and Rozzi...
1998, Meffe and Carroll 1994). The potential for overlap between natural and social sciences provides for a special interdisciplinary identity in conservation biology (Primack 2000). This special identity provides society with an arena for innovative design and the rapid implementation of new policy that addressed the challenges contributing to the loss of biodiversity and habitat around the planet.

The Interdisciplinary Hypothesis includes by its definition a circular and adaptable series of "steps" for any collaborative approach to the challenge of biodiversity conservation. These steps are to identify problems, analyze, assess, form policies, implement, and administrate. Different disciplines are merged through the integration of information, perspective, and strategy in each one of these steps. By agreement on a common objective, such as contributing to the prevention of untimely extinctions of species, different disciplines can converge on strategy and implementation. Similarly, this paper merges information from various disciplines through a number of the steps listed above, focusing on identifying problems, analysis and assessment of the issues. Though this paper will briefly provide some suggestions for conservation action, the role of a North American in actually structuring, implementing or administering elements of reserve design proposals for southern South America is a delicate issue. Through the common goal of prioritizing global biodiversity conservation, practitioners of different disciplines from different nationalities can effectively and respectfully come together in conservation and social planning.

Interdisciplinary Studies and Considerations in the Design of Reserve Systems

Contemporary land management and conservation planning is best summarized for the purposes of this methodology by the concept of reserve system design. As a means of outlining the goals of maintaining biodiversity, there are a number of fundamental objectives defined in Reed Noss and Allen Cooperrider's book Saving Nature's Legacy (1994). These objectives range from the maintenance of ecological and evolutionary processes, to the maintenance of viable populations of native species, to the management of landscapes for both
short-term and long-term environmental changes, to the representation of different native ecosystem types in a system of protected areas. These objectives are to be realized within a spectrum of land management situations and contexts, and accomplishing them requires the prioritization of the conservation of biodiversity in decision-making. Essentially all land management is destined to have an impact on biodiversity, whether negative or positive, intentional or unintentional (Noss and Cooperrider 1994). Reserve system design takes these impacts into account and presents a model for attaining objectives of conservation in light of these impacts.

Reserve system design is a means of meeting the objectives outlined above, and its ecological implications will be discussed further, as it is one of the central themes of Chapter 3, "Scientific Considerations in the Design of a Transboundary Reserve System in Southern South America." Theories of reserve system design extend beyond protected areas. Many natural scientists have recognized the need to place protected areas in the context of a larger mosaic of the local, regional, and continental landscape. For instance, Chilean ecologists have recognized that "conservation strategies that encourage the careful planning and regulation of land use in the matrix surrounding existing and new protected areas should become a priority" (Armesto et al. 1998). This type of coarse-scale (Forman 1995) analysis and planning is important for the scientific basis to the conservation of biological diversity.

The design of reserve systems, or of a reserve "network," receives a great deal of attention in science and conservation biology literature. Though the ideas of working to conserve nature at a variety of spatial scales, from continental to local, tend to be rooted in scientific study and theory, many important considerations go well beyond the realm of the natural sciences. These considerations must be understood for the successful design and implementation of such a system or network (Meffe and Carroll 1994). Conservation biology theory describes three major "classes of concern" in creating reserves (Meffe and Carroll 1994). These are the biological considerations, the cultural and anthropological considerations, and the political and economic considerations.
(Meffe and Carroll 1994). In attempting to discover practical applications of interdisciplinary work in biodiversity conservation, these considerations in conservation reserve design have been adapted to provide the structure of investigation used in this paper.

By integrating transborder/transboundary studies (Hamilton et al. 1996), the Interdisciplinary Hypothesis, and the various considerations in reserve system design, the study method for this paper is structured roughly into three major realms of investigation. This study follows a structure that analyzes the three main areas of a) the scientific concerns, b) the administrative and legal frameworks, and c) the social and economic considerations. This paper is divided along these lines in order to systematically investigate the natural and human spheres that must be addressed to develop viable long-term conservation strategies in a transboundary context. This particular work takes southern South America as a case study, in order to present valuable information that can assist in promoting conservation in the region of study. In addition, the structure of this paper and the application to the study area are meant to experiment with a study method that can be repeated and/or applied to other regions throughout the Americas and around the globe.

In Chile, there is documentation of how important protected areas are in assisting society to integrate human lives and lifestyles into the natural world (Calcagni et al. 1999). Protected areas, which could qualify as "core habitat reserves" in the vocabulary of conservation biology, have a special place in conservation and social sciences. They are the cornerstones of all biodiversity protection, and just as with concepts of sustainability, core areas merit rigorous definition and protection. Places that possess qualities of large and intact wild areas but are not legally protected also qualify as core reserves. These core areas are "where nature reigns" (Noss et al. 1999), where the conservation of biodiversity begins. Though it is widely recognized that protected areas are not enough to maintain biodiversity, they are also widely accepted as being absolutely essential (Calcagni et al. 1999, Noss et al. 1999, Brandon et al. 1998). In relating core areas to the methodology of this study, it is proposed that the scientific base
to a reserve system design strategy is the actual core of a conservation strategy based on the Interdisciplinary Hypothesis and sustainable living. Chapter 3, "Scientific Considerations for a Transboundary Reserve System Design," is dedicated to the subject of the scientific core of the information presented here.

In the design of a reserve system, a key objective is to maintain connectivity on the landscape and between core reserve areas (Dobson, et al. 1999, Harrison and Voller 1998, Noss and Cooperrrider 1994). One need only observe the highly fragmented nature of much of the landscape surrounding many increasingly isolated parks, to realize that connectivity is often times challenged by the growth of human activity. Depending on the administrative resources and nature of the region, this challenge to connectivity can be managed to varying degrees, utilizing management, legal and administrative frameworks to carry out strategies. Symbolically, connectivity can be perceived as the efforts of conservation science's management to reduce fragmentation of landscapes in concert with legal structures that limit the impact of human activities. This is the subject focused upon in Chapter 4, "The Administrative-Legal Framework of Forest Protection in Argentina and Chile."

The administration of land becomes more intensive as the density of human population increases. Whether on lands adjacent to or far from protected areas, human activity carries tremendous risks of impact on core areas and their connectivity. Much reserve design theory emphasizes buffer zones in order to mitigate this activity, occupying another class of land management that will reduce human impacts on biodiversity (Groom et al. 1999, Harrison and Voller 1998, Noss and Cooperrrider 1994). Planning that encourages connectivity and buffering has to be sensitive to scientific and human needs in order to increase the chances of success. In the scope of a true interdisciplinary effort in generating an effective politics for biodiversity conservation, the concept of buffer zones alone is insufficient for addressing the social and economic issues that directly impact the conservation of biodiversity. This concept is more effectively broadened when addressed in terms of society wide buffering strategies. Chapter 5, "Buffering Strategies: Responding to the Challenges of Sustainability," discusses
social and economic considerations in the design of a transboundary reserve systems. Amplifying the ecological implications in the dialogue around social planning as well as the social implications in land management will ideally assist in breaking down the barriers that are inhibiting a truly interdisciplinary response to the global extinction crisis.

Standards of conservation and sustainable living have to be rigorous in order to maintain integrity in the natural environment, and to ensure that human needs are met. There are cultural and institutional challenges to this rigor, and political, professional and social risks to be confronted in standing firmly by these standards. For instance, making *buffering strategies* a policy implemented throughout society, and not just in lands surrounding a protected area, is a conceptual advance in reserve system design. It extends the presence of the intact core habitat further into the sphere of the human, as opposed to strategizing to decrease or mitigate human presence in the sphere of the core areas. In the Interdisciplinary Hypothesis and reserve system design methodology described for this study, the cores are the ecological heart of all planning, the buffering strategies the social body, and connectivity is an art of administrating land and law in blending the two together. The following three chapters are an experiment in the application of this analysis, as applied to southern South America.
Section III. Results and Discussion

Chapter 3

Scientific Considerations in the Design of a Transboundary Reserve System in Southern South America

The following discussion is intended to provide an introduction to the scientific considerations in designing a transboundary reserve system in southern South America. The purpose of this chapter is to note the specific ecological and biological characteristics of the southern temperate forests of South America in order that theories of reserve system design can be appropriately applied to the ecoregion. Before examining regional specifics it is necessary to briefly review some general conservation reserve design concepts.

Ecological integrity is a key concept that has been included as one variable of a rigorous definition of sustainability. The maintenance of the historic species composition and structure of a biotic community is one important measure of ecological integrity (Callicott 1997). Sensitive species, interior species, and any species that may come into conflict with humans merit habitat that is not “rendered unfit for them by human residency and/or human activity” (Callicott 1997). A group of noted conservation biologists wrote, “to conserve populations of endangered species that are habitat specialists…there is no substitute for well-protected core areas” (Noss et al. 1999).

In particular, “a distinguishing characteristic of core areas is limited human access—that is low road density or preferably, roadlessness” (Noss et al. 1999). Roads are recognized to be the source of tremendous terrestrial and aquatic habitat fragmentation with ecological impacts far beyond the road itself (Trumbulak and Frissel 2000). Roadless habitat is increasingly important for conservation, as human activity can be measured on a large spectrum, from minimal to intense, and it is in areas where human activity has not yet converted the landscape to resource use that biodiversity may be most effectively conserved.
At the same time, it is essential to maintain a flexible perspective on core habitat priorities. For instance, in the coastal range of Chile, the remaining islands of the highest biodiversity are small and under intense pressure (Armento et al. 1998). The high standards by which core areas should be managed are applicable to these small islands whose fragmented nature actually disqualifies them as true core reserves. Nevertheless, these small islands need to be treated as strict reserves as much as possible, even if they are small islands in a matrix (Forman 1995) of intense human activity.

Connectivity is necessary for the long-term conservation of core habitat and protected areas, which are often times the most intact remaining core habitat, even with the existing degree of threat to parks and protected areas (Dobson et al. 1999). Connectivity is also essential regardless of protected areas or in landscapes without protected areas, as it is key to maintaining viable populations of both animal and plant species, and for the flow of nutrients, energy, and water (Dobson et al. 1999, Harrison and Voller 1998). Maintaining or reestablishing connectivity is one of the most vital objectives of a regional scale reserve system (Dobson et al. 1999).

Another important issue in reserve design is that of scale (Scott et al. 1999, Meffe and Carroll 1994). It is now widely understood that the importance of planning at a level that takes into consideration “large-scale spatial patterns...such as the continental migration of birds” cannot be underestimated (Trombulak 1996, Dyer and Holland 1991). The fact that important interactions are suspected to occur between maritime and terrestrial ecosystems, such as the transfer of nutrients by seabird populations to the terrestrial ecosystems where they roost (Scott et al. 1999), is of particular relevance to the southern temperate forests. Scale has a great deal to do with dynamics such as disturbance affecting landscapes, another important concept to consider in reserve system design (Veblen et al. 1995). The importance of spatial and temporal scale in planning for the conservation of biodiversity is one of the strongest arguments for promoting a regional transboundary reserve system in southern South America, in order that the implications of the interactions between what might be thought of as spatially
and functionally distinct ecosystems can be considered (Scott et al. 1999). These perspectives on scale provide substance to the argument for approaching conservation planning for the southern temperate forests as a whole, and not simply in disparate units, even across the landscape dedicated to intense human activity. Of course, practicality also encourages working on less grand levels of scale, while keeping the "bigger picture" on the radar screen.

Buffer zones, or transition zones, are an important part of "big picture" landscape scale conservation planning (Primack 2000, Groom et al. 1999, Callicott 1997, Dyer and Holland 1991). Transition or buffer zones are the landscapes where human economy is managed so as to maintain ecological sustainability in the landscape as a whole and ecological integrity in the protected area in particular (Primack 2000, Peck 1998, Callicott 1997, Grumbine 1994, Dyer and Holland 1991). As noted previously, such management is more than just natural science, and a profoundly interdisciplinary approach to conservation will expand the buffer zone concept to include diverse regional and global buffering strategies. Chapter 5 will expand upon this concept in greater detail.

It is important to note that it has been suggested that reserve system design should be begun with mapping (Trumbulak 1996, Soule and Terborgh 1999). In the literature advocating and describing such designs, there is a strong emphasis on Geographical Information Systems (GIS) (Trumbulak 1996). This type of mapping was one of the original objectives of the Gondwana Forest Sanctuary meetings, though the mapping projects have made little or no progress towards achieving stated objectives.

In the opening to this paper it was explained that this research project itself did not endeavor to attempt to develop maps. This paper is intended to complement such mapping projects by providing an interdisciplinary scientific basis to reserve system proposals, and to delve into the interdisciplinary subjects of conservation planning that GIS has historically ignored. Mapping can be an influential aspect of concrete conservation proposals. Though one of the conclusions of this paper is that further resources should be dedicated to developing conservation GIS efforts in the temperate forest regions of South
America, it must be noted that in Chile and Argentina mapping proposals are
oftentimes received skeptically and are considered to be less of a priority than
other potential "on-the-ground" conservation investments. This text attempts to
anticipate future mapping projects, and provide information that is relevant with
or without mapping, as well as information that will identify important future
mapping subjects. It is essential to recognize the significance of mapping; the
purpose of such mention here is to note that this paper has been composed
recognizing both the limits and the potential of conservation GIS in forwarding
conservation in southern South America.

The above issues, taken in conjunction, are an important scientific step in
moving from the sole selection of specific conservation areas to designing a
regional scale reserve system, a crucial change in moving towards maintaining
viable populations. Once the topic of spatial and temporal scale has been
broached, it is insightful to look back at the origins and current characteristics of
particular landscapes. The history and the characteristics of a place provide the
unique details that give body to the skeleton of concepts making up reserve
system design.

The Temperate Forests of Chile and Argentina: A Biogeographical Island

Continental drift and its effects on the distribution of species are now
understood to be a significant aspect contributing to the character and
composition of the temperate forests of South America, as the ancient super­
continent of Gondwanaland included what we know as South America,
Antarctica, Australia, New Zealand, New Caledonia, and New Guinea (Markgraf
et al. 1996, Hill 1996, Arroyo et al. 1995). This connection was not severed until
late in the Tertiary, or by the early Oligocene, when "floristic interchange" with
Australia by means of Antarctica "was interrupted" (Markgraf et al. 1996). This
period of migration of species from Australia was marked by much warmer
climatic conditions, when it appears there was much greater continuity between
temperate zones and tropical zones (Arroyo et al. 1995).
Plate tectonics and continental drift have influenced more than the ancient floristic heritage of the southern temperate forests. Volcanism is both historically and currently an important abiotic influence on the ecosystems of southern South America. Since the severance of southern South America from the Antarctic continent, there have been a series of mountain building events that have been relevant to the evolutionary history of forest ecosystems (Armesto et al. 1994). Since about the middle of the Tertiary, and during the entirety of the Quaternary, the temperate forests of Southern South America have remained isolated from other forest ecosystems on the continent due to the formation of the Atacama Desert and the Andes mountains (Armesto et al. 1994), leaving them separated by more than 2000 kilometers of arid landscapes from the nearest forest ecosystems in northeast Argentina and southeast Brazil (Armesto et al. 1995). This isolation, which has been occurring for at least the last one and a half million years due to the “barrier effect” of the mountains, the desert to the north, the oceans to the west and south, and the Patagonian steppe to the east, is of extreme importance when investigating the southern temperate forests of Chile and Argentina (Armesto et al. 1994, Armesto et al. 1995).

More recently, with the last event occurring between 20,000 and 10,000 years ago, glaciations have had a tremendous impact on the geographic distribution and composition of species in the southern temperate forests (Armesto et al. 1994, Markgraf et al. 1996). Significantly, the geographic isolation of the southern temperate forests contributed to the degree that the glaciations reduced the area covered by forests and their diversity of species (Armesto et al. 1994). The glacial events are important in identifying the significance of the glacial refugia that provided haven for the forest in retreat before the advancing glaciers (Smith-Ramirez 2001, Premoli et al. 2000, Armesto et al. 1995a, Armesto 1994). Such information about historical distribution will assist in accounting for future climate changes, identifying past centers of diversity and endemism, and understanding the character of the southern temperate forests as a whole (Smith-Ramirez 2001, Premoli 2000). As a matter of fact, it has been noted that “climate, especially zonation of climate, has...been
profundely important for a very long time in determining patterns of distribution in the far south” as “cold and related climatic factors that increase in intensity toward the south (presumable alternation of seasons, shortness of days in winter, and lack of warmth in summer, as well as direct cold) make a...fundamental pattern in species distribution” (Darlington 1965).

The processes of climate provide a thread that ties historic and contemporary natural processes together, emphasizing the relationship of the composition of nature with the mechanics of influences that span a multitude of temporal and spatial scales. Disturbance patterns of phenomena beyond glaciations and volcanism, such as fire, landslides, avalanches, and wind, continue to play a major role in the Patagonian forests (Donoso 1993, Veblen et al. 1996). Taken all together, the internal and external factors of plate tectonics, disturbance, environmental conditions, and evolution contribute to the conceptualization of the biogeographical history of the southern temperate forests.

Beginning with an ancient “center of origin” for many primitive species now found in the Patagonian forests, the initial dispersal of species occurred before ancient continents had divided, creating an original composition of species that over geologic time would be influenced by the north-to-south dispersal of organisms within South America itself (Darlington 1965), by the dynamic rise and fall of barriers within and around the continent and the southern region specifically (Briggs 1987), and by disturbance patterns—including anthropogenic influences (Donoso 1993, Armesto et al. 1994, Veblen et al. 1996).

A biogeographical history not only permits one to have an idea of the true ecological value of the remaining southern temperate forests in Chile and Argentina (Armesto 1994), it also provides some insight to the heritage that these forests possess. For instance, it is well known that the prolonged isolation of Patagonia is reflected in the high rates of endemism of the flora (Armesto et al. 1994, Arroyo et al. 1996), but it is also reflected in the relatively low species diversity of vertebrates, even though seven of the mammalian genera present in the region are themselves totally endemic, with a total of 30 percent of the actual mammal species being endemic (Meserve 1996, Murua 1995, Armesto et al.
1995b). Of the native woody plant genera of the southern temperate forests, 34 percent are totally endemic, 25 percent are considered neotropical, being restricted just to South America, and 38 percent are considered gondwanic, with additional species in Australia, New Zealand, etc. (Arroyo et al. 1995). The remaining woody plant genera are considered to be either intrusive (coming from nearby non-forested ecosystems) or boreal, having origins in the northern hemisphere (Arroyo et al. 1995). It is estimated that 50 per cent of the native species in Chile are totally endemic, and half of the estimated 740 plant species in the temperate forests are limited to the humid Pacific Coast rainforest (Armesto et al. 1994, Arroyo et al. 1996). It is interesting to note that a distinction can be made between species endemics depending on their historical development; a "paleoendemic" is a relict, often of primitive origin like the gondwanic genera, whereas a "neoendemic" will be newly evolved, as the neotropical species are more likely to be (Myers and Gillers 1988). This distinction lends perspective to the roots of southern temperate forest endemism. The composition and distribution of the species in the southern temperate forests truly are unique, and of global importance for biodiversity conservation (Dinerstein 1998).

Considering the high rates of endemism and the obvious importance of the southern temperate forests for regional, continental, and global conservation of biodiversity, it is important to keep in mind the threats being placed on these forests by human-caused fragmentation. Humans, with their economic activities and use of the natural landscape over the last 200 years, have reduced the southern temperate forests at a scale similar to the reduction experienced with the last glacial age (Armesto et al. 1994). This regional-scale fragmentation as a result of human activity is as much a part of biogeography as are the actions of plate tectonics. Human-caused "vicariance" (Cox 1973) is especially important to consider in conjunction with evidence about climate change, whether human-induced or not, as climate change has great effect on both organism dispersal and the maintenance of species communities (Veblen and Alaback 1996). This combination of human impact and climate change has serious implications for biodiversity management (Alaback 1996).
Characterization and Description of South America’s Temperate Forests

The previous discussion emphasized the fact that “the temperate forests of South America are geographically isolated from other tropical and sub-tropical forest formations on the continent,” making the region a virtual biogeographical island (Armesto et al. 1995b). The temperate forests, by definition, are found outside tropical regions and in most instances are subject to cold winter temperatures that limit tree and plant growth. The temperate forests extend poleward from about 35 degrees south of the equator in more or less continuous form to the islands of Magellanes and Tierra del Fuego at about 56 degrees south, forming the southern most forests on the planet (Armesto et al. 1995a, Veblen et al. 1996). They are largely found on the west slopes of the Andes, with a long thin stretch of forest running along the eastern slopes in Argentina before giving way to the Patagonian steppe (Armesto et al. 1995b).

The Andes influence vegetation patterns and climate, stretching north-south at an average altitude of around 1000 meters on Tierra del Fuego to well above 3000 meters at around 35 degrees south (Veblen et al. 1996). The topography is marked by two mountain ranges for the northern part of the temperate forest range; north of 43 degrees south the Andes are paralleled by a shorter and less precipitous range along the coast (Armesto et al. 1995b, Veblen et al. 1996). As a forested area that was not to be glaciated or impacted by volcanoes over the course of several hundreds of thousands of years, it is this coast range that contains the highest biodiversity in the southern temperate forests (Smith-Ramirez 2001, Armesto et al. 1994). The original native biodiversity was greater the further north one went along the coast range, before being so heavily impacted by the exotic-species tree plantation forestry model (Neira et al. 2002, Armesto et al. 1994). It is in this coast range, over the last three decades especially, that human activity and industrial forestry have been the most concentrated. Nevertheless, as will be discussed further, this area continues to be a conservation priority.

South of 43 degrees south, the coastal mountains become islands, the coastal topography becomes much more complicated, and the Andes mountains nearly
rise from the sea (Veblen et al. 1996, Santilices 1991). There are large areas of this coastline that have not yet been fully explored, and whole ecosystems that have not yet been studied (Santelices 1991). Granted, many of these ecosystems are not forest ecosystems, but the rate of endemism in the littoral ecosystems is estimated at high rates, similar to that of the forests (Santilices 1991). This southern coastal and mountain area of the Americas is a labyrinth of fiords, canals, archipelagos, densely vegetated mountain ranges, and brutally wet and cool weather.

Due to the maritime influence, the predominant weather of the temperate forests presents relatively “equitable” conditions, with moderate temperatures that do not vary excessively between the warmest and coldest months of the year, and persistent rains, in that precipitation rates climb above 4,000 mm a year in many coastal areas south of 40 degrees south (Armesto et al. 1995b, Veblen et al. 1996). The only predictable seasonal change comes in the zones north of 42 degrees south, where a marked summer dry season often occurs (Armesto et al. 1995b). A gradient of precipitation exists from west to east as well, where a rain shadow effect of the Andes can reduce precipitation in the Argentine temperate forests from about 3,000 mm a year in the highest reaches of the mountains to less than 800 mm annually at the far eastern edge of the forests’ range (Veblen et al. 1996). Generally, it is thought that the climate west of the Andes is more favorable to the growth of forests than that to the east (Schmaltz 1991). A similar gradient is described from north to south, to the extent that as mean annual temperatures and the growing season decline from north to south, so do forest biomass and species diversity (Veblen et al. 1996).

This gradient can be used to roughly distinguish between vegetation patterns as well, describing a variety of forest types, or more specifically, phytogeographic regions (Veblen et al. 1996, Gajardo 1994). There are a number of different means to do this, but for the general purposes of this paper we will divide the temperate forests of South America into several regions as described in Ecology of Southern Chilean and Argentinean Nothofagus Forests (Veblen et al. 1996). This categorization is by no means definitive, but it does help to visualize the
character of different forested zones and to conceptualize regions within regions, facilitating practical conservation planning. The Valdivian Rainforest starts at the southern end of the warm temperature deciduous *Nothofagus* forests, the *Nothofagus* tree species being one of the classic gondwanic influences in the southern temperate region, present to some degree in the entire area (Veblen et al. 1996, Schmaltz 1991). Oftentimes the Central Chile Region as a whole, from 35 degrees south until about 40 degrees south of the equator, is considered its own forest region (Povilitis 1998, Donoso 1996, Wilcox 1995). Regardless, rainforests are the norm on the Chilean side of the Andes south of the warm-temperature deciduous *Nothofagus* forests; from 37 degrees south to about 43 degrees south the Valdivian Rainforest prevails; south of 43 degrees south until the 47th parallel is the North Patagonian Rainforest; in the far south, from 47 degrees south of the equator until the southernmost islands of the Magellanic archipelago at 56 degrees south is the Magellanic Rainforest (Veblen et al. 1996). All three of these rainforest types would be considered *bosque siempreverde*—that is, evergreen and broadleaf forest. While north of 47 degrees south there are several endemic conifer species, including the millennial *alerce* (*Fitzroya cupressoides*) and *araucaria* (*Araucaria araucana*) trees, south of the 47th parallel there are no conifers and the forests are dominated by *Nothofagus* tree species and interspersed with maritime, glacial, heath and peat bog ecosystems (Veblen et al. 1996). This conifer-free forest type is typical across the west-to-east gradient of the most southern reaches of the Magellanic region. The eastern extent of the area between 35 degrees south and 47 degrees south is known as cool temperate forest and woodlands, or the *bosque andino patagonico* (Gajardo 1994). This forest is recognized for containing *Nothofagus* species, and also for hosting the endemic cedar *Austrocedrus chilensis*, another millennial conifer of which only rare ancient stands remain (Gajardo 1994).

As noted previously, the southern temperate forests exhibit a particularly high diversity of different forms of life. Some of these, like the endemic vines and epiphytes, are completely absent or extremely rare in many temperate forests (Armesto et al. 1995a). There are still many unidentified lichens and mosses.
hidden within these highly productive forests that can contain more than 1,000 tons of biomass per hectare (Armesto et al. 1995a). Another remarkable characteristic of these forests is the predominance of angiosperms over gymnosperms; the majority of the forest types in the austral forest are almost exclusively made up of angiosperms, and where there are conifers, the coniferous trees are often very much in the minority (Armesto et al. 1995b). Some of the alerce and araucaria forests provide a notable exception to this, though the broadleaf trees are almost always present to some degree. Other than in a few Nothofagus forests at the altitudinal and latitudinal limits of the forest range, the southern temperate forests almost always contain many elements of the bosque siempreverde, which shows the overall dominance of evergreen trees over deciduous trees (Armesto et al. 1995b, Veblen et al. 1995). These are all characteristics that distinguish the southern temperate forests from much of the northern temperate forests, and comprise their unique ecological value.

Another distinguishing characteristic of the southern temperate forests is the high percentage of fruit producing forest species; on the island of Chiloe it is estimated that 60 percent of the plants possess “meaty fruits” (Armesto et al. 1995b, Willson et al. 1995). Such characteristics have serious implications for conservation planning (Aizen and Ezcurra 1998, Willson et al. 1995). For instance, it has been determined that “the flora of the temperate forests of southern South America highly depends on animals for pollination and seed dispersal” (Aizen and Ezcurra 1998). Such ecological relationships have important ramifications when considering the design of a reserve system, as mutualisms and symbiotic relationships have tremendous influence on the life cycles of species (Barnes et al. 1998). Not only are animals important for dispersing seed and pollen and assisting in plant reproduction, the plants themselves represent important sources of nutrients for insects, birds and mammals in the form of nectar, pollen, and fruit (Armesto et al. 1996, Rozzi et al. 1995, Willson et al. 1995).

These relationships must be taken into account in the designing of a successful conservation strategy. As an example, the potential loss of a single
species of hummingbird (*Sephanoides galeritus*) will be reflected in the reduced reproductive levels of a significant proportion of the flora in the region (Aizen and Ezcurra 1998). When an area is fragmented by human economic activity, it is probable that many of these essential mutualistic relationships are interrupted (Willson et al. 1995). Though some of the principal mutualistic birds, like *Sephanoides galeritus* mentioned above, appear to be fairly resilient to fragmentation, many of the plants pollinated by birds live only in primary forests and do not survive in isolated fragments of forest (Willson et al. 1995). Such a reduction in food sources for pollinators may lead to lowered populations of the pollinators themselves, resulting in the concurrent reduction in plant populations due to reduced reproduction rates (Willson et al. 1995). Mutualisms are one important example of the complicated relationships that must be taken into consideration in “ecomosaic theory” and in proposing regional scale conservation strategies. Considering the changes that climate change may have on disturbance regimes and the geographic distribution of plant species like those of the *Nothofagus*, there are many unknowns of the temperate forests in South America that will require consideration in conservation planning (Veblen et al. 1996). Contemplating the high incidence of interdependence and the unknowns of climate change, there are strong arguments for the protection of the remaining primary forests in the region.

The Huemul: Transboundary Conservation Planning with Focal Species

The mention of a hummingbird species and the significance of its conservation on the remainder of the forest ecosystem bring to light a strategy that may have significant effectiveness in the Patagonian region. The use of “focal species” in the design of conservation strategies is gaining constant validation. The primary concept behind the use of focal species in reserve system design is that the species’ “requirements for survival represent factors important to maintaining ecologically healthy conditions” (Miller et al. 1999). Delving further into the status of many species of concern in the southern temperate forests will
assist a practical approach using focal species to facilitate the design and implementation of a transboundary reserve system that will be resilient to climate change and ongoing anthropogenic fragmentation.

Unfortunately, Chile and Argentina do not lack for threatened and endangered species. It is estimated that 35 percent of the vertebrate fauna in Chile are in some state of conservation concern (Iriarte et al. 1992, CONAF 1999). Particularly stark are the figures expressing that 100 percent of the freshwater fish and up to 78 percent of the amphibians of Chile can be considered to possess problems of conservation (CONAF 1999). When these facts are taken into account with the recognized high rates of endemism in the region—in some groups of mammals as much as 60 percent of the species are endemic (Iriarte et al. 1992)—the loss of species in the southern temperate forests is truly understood as a global loss to biodiversity. For instance, as long ago as 1985 it was recognized that 100 percent of the floral species classified as endangered were endemic species (Iriarte et al. 1992). It is worth noting that as of 2001 there were no government plans or intentions to update the Red Books of Chilean flora and fauna in problems of conservation; these books were originally composed in the late 1980’s. In both Chile and Argentina it is clearly possible that, without taking measures immediately, species demonstrating problems of conservation will disappear in the near future (Iriarte 1994, Iriarte et al. 1992).

In the southern temperate forests it is understood, as it is described theoretically in many texts on conservation planning, that most protected areas are too small and too isolated to guarantee the long-term conservation of the majority of species in the biosphere, and specifically in the temperate forest zone of South America (Soule and Terborgh 1999, Armesto et al. 1998, Wilcox 1995, Iriarte 1992). Therefore, it is necessary, in the planning of conservation and in the integration of protected areas with human dominated landscapes, to begin contemplating larger scale efforts that take into account the entirety of a region in question in order to effectively zone and manage the land to insure that species are not lost (Soule and Terborgh 1999, Noss and Cooperrider 1994, Forman 1994). It is within this theoretical framework, and within the context of a serious
biodiversity crisis in southern South America, that a “focal species” (Miller et al. 1999) conservation strategy for the southern Andes is proposed. While certainly not the “silver bullet” that will resolve all issues of environmental degradation in the southern temperate forests, there is strong evidence that such a strategy will be instrumental for amplifying the perspective of scale within which the conservation of biodiversity must take place, as well as encourage and facilitate the transboundary and regional efforts that are needed in order to make conservation efforts successful.

There are admitted weaknesses to the strategy, and that is why the themes of representation and special elements are important to consider as well in designing a reserve system, to insure that critical species and processes do not fall through the coarse scale cracks (Miller et al. 1999). A special element could be considered the presence of an intact old growth forest, a substantial roadless area, an area of high endemism or species richness, the presence of a particularly rare or significant species, an important watershed, or even an area that is adjacent to an already protected area (Noss et al. 1999). Representation, or the “heterogeneity of protected landscapes” (Meffe and Carroll 1994), is also known as the “coarse filter” strategy, which “seeks to protect intact examples of each vegetation or habitat type in a region” (Noss et al. 1999). To insure protection against catastrophic disturbance, it is ideal to attempt to include several samples of each example of vegetation or habitat types. Focal species analysis for selecting core habitat and designing connectivity strategies brings the issue of scale back into the equation (Noss et al. 1999). All three of these categories of special elements, representation, and focal species strategies have their strengths and weaknesses; it has been noted that focal species strategies may not be sufficient for adequate biodiversity conservation, while protecting for special elements may lack the true scale necessary for long-term conservation needs (Noss et al. 1999, Kerr 1997).

There are important strengths to a focal species strategy. For instance, it is noted that the protection of “small, inconspicuous plants” such as bryophytes needs to be carried out “in connection with the conservation of attention-getting,
'flagship' or 'keystone' plant and animal species" (Tan and Pocs 2000). In the establishment of large enough reserves to protect these larger species “the survival of bryophytes that share the same ecosystem can be assured” (Tan and Pocs 2000). These themes, strengths, and weaknesses will be discussed further by elaborating on the focal species strategy, and how such a strategy might be applied in the temperate forests of South America.

There are several different types of focal species categories, and it is helpful to examine these categories before selecting a species, or a “suite of species” to serve in the conservation strategy (Noss et al. 1999, Miller et al. 1999, Noss and Cooperrider 1994). A “suite of species” is often recommended, as no single species can serve to meet the needs of all others (Noss et al. 1999, Miller et al. 1999). One must coherently describe the different focal species categories, as the intent and purpose of selecting different species must be clear, in order that the conservation of these species will provide for the goals of the larger regional scale system of protected areas and land management (Noss et al. 1999). The categories are functionally different, yet they compliment each other, serving as another justification for selecting a small group, or “suite” of species (Miller et al. 1999). The following are definitions of the roles that different focal species can fulfill (from Miller et al. 1999):

- A **keystone** species is an organism that enriches ecosystem function through their activities, and whose effect is disproportionate to their abundance. A **keystone** species is defined by ecological value.
- An **umbrella** species will cover large areas in their daily or seasonal movements, whereby protecting enough habitat for a viable population of this species benefits many other species. This focal species is key for land management; especially in concern of the size, shape, and distribution of protected core areas and corridors for maintaining connectivity, presuming that all or a majority of their habitat will be managed for species conservation.
- A **flagship** species is a charismatic animal that has wide cultural appeal and can help draw attention to conservation goals. **Flagship** species are the base
ingredient to public relations and education campaigns; the reception given to a flagship species is integral to building public support for conservation objectives.

- An *indicator* species is tightly linked to biological elements and qualities, and is sensitive to ecological changes. These species are essential for monitoring the ecological integrity of a landscape.

As a point of reference for selecting focal species, it is recommended that a short list be composed that includes a combination of endangered and threatened species, culturally important species, economically important species, and endemic species from the region in concern (Miller et al. 1999). It is not necessary, nor recommended, that all focal species in the “suite of species” be endangered, both for political and ecological reasons (Miller et al. 1999). What is necessary is that a compact list of species that compliment each other in fulfilling a variety of focal species roles be presented as a means of guiding conservation and land use planning, giving definition to monitoring regimes, and putting a recognizable and charismatic face on the biodiversity at risk. Combined with planning that takes into consideration special elements and representation, focal species strategies provide a defensible launching pad for promoting regional scale and transboundary conservation strategies.

Without dictating campaign strategies for conservation advocates in the southern temperate zone, a short list of a sample “suite of species” is presented here, describing the potential focal species and the roles that they might play in an integrated reserve system design. This short list has been selected in hopes of opening discussion as to how integrated conservation planning might be strategically simplified while still meeting ecologically and biologically defined criteria, assisting in practical applications of limited conservation resources in the southern temperate zone of the Americas.

Although there are many questions still to be answered about many of the components in the Chilean and Argentinean temperate forests, including many key mammals (Valverde 1998, Donoso 1993), there is enough known about
certain species to suggest them as focal species. For instance, the discussion concerning mutualisms emphasized the niche that pollinators fill in the ecological functions of the southern temperate forest ecosystem (Aizen and Ezcurra 1998, Rozzi et al. 1995). Certain cavity dwelling birds must depend on old growth forests for nesting, and are therefore important for recognizing special elements that could be included in reserve system design, as well as serving as focal indicator species (Miller et al. 1999, Rozzi et al. 1995). The southern temperate forest equivalent of the spotted owl, the concon (Strix rufipes) is considered to be an inhabitant of mature forests (Rozzi et al. 1995). Another bird species that is recognized to be in a serious state of conservation distress is the carpintero negro, or Magellanic Woodpecker (Campephilus magellanicus). This woodpecker is considered to be vulnerable to extinction (CONAF 1999). For the purposes of a proposed focal species strategy, it is suggested that the hummingbird Sephanoides galeritus be selected to serve as a focal keystone species for its recognized role in pollination, while the magellanic woodpecker and the concon (Strix rufipes) should be selected to serve as indicators of old growth qualities in the temperate forest. Though it is helpful in the beginning to keep the focal species list as short as possible, including three different bird species will provide rigorousness to the focal species strategy. It is worth noting that 100 percent of the birds that inhabit the bosque siempreverde have been found in primary forest, while only a third have ever been registered in secondary or recuperating forests (Rozzi et al. 1995). The fact that small patches of forest can serve in providing habitat for birds (Rozzi et al. 1995) encourages the selection of these birds for the “suite of species” in order that the special elements of remaining forest in heavily impacted landscapes receive the appropriate conservation attention.

Another vertebrate species that can serve as an important indicator species is the endemic river otter, the huillin (Lutra provocax). River otters are considered strong indicator species for river systems (Miller et al. 1999). The huillin is a species that is considered endangered (CONAF 1999) through much of its original range in southern South America. The desperate conservation needs of this aquatic carnivore, the importance of river and watersheds as special
elements in conservation strategy due to their role in providing connectivity and appropriate scale to planning, and the capacity of the otter to serve as an indicator of riparian health are all strong arguments for including the *huillin* as an *indicator* species in a suite of species. The *huillin* is also a recognizable mammal that may serve as a potential *flagship* species. A freshwater aquatic mammal is an effective compliment to terrestrial species, in order that representation in protected area planning is fulfilled as well.

Notably, there are no floral species as yet proposed for the “suite of species” being discussed here. There is some evidence that the *Nothofagus* species may be particularly susceptible to climate and atmospheric change, with particular concerns in the southern cone about the exposure to UV radiation that accompanies ozone depletion (Veblen et al. 1996). It has been suggested that broad corridors will be needed to accommodate changes in *Nothofagus* distribution due to imminent and current climate change (Veblen et al. 1996, Markraf 1996). In this sense, due to the large spatial needs for conserving *Nothofagus* species, these tree varieties could be considered appropriate focal *umbrella* species for a transboundary reserve system design. As well, due to the *gondwanic* origin of the southern beech *Nothofagus* species, these species serve as excellent *flagship* species. They are neither endangered nor vulnerable, but anticipating global and regional climate changes is an important aspect of conservation planning (Armesto et al. 1994, Fuenzalida et al. 1989). Accordingly, the endemic *alerce* and *araucaria* conifers, considered to be in a far graver conservation condition (Wilcox 1995, Lara and Villalba 1993), could prove to be effective *flagship* species, though the planning for their conservation may concentrate on special elements due to the loss of much of the habitat in their historic range. As well, evidence concerning glacial refugia shows that certain places qualify for conservation as special elements due to the longevity of the floral communities and their genetic diversity being traceable far into the past (Smith-Ramirez 2001, Premoli et al. 2000, Armesto et al. 1995a). Despite doubts about how to select or apply floral species to such a focal species effort, it does
seem apparent that a floral species or genus would be an effective part of a focal species strategy for the southern temperate forests.

Carnivores have a tremendous role in ecosystems due to their influence in "regulating" ecosystems (Terborgh et al. 1999). Large carnivores can definitely be considered *keystone* species because of the pronounced effect they have on the ecosystem (Miller et al. 1998). The most significant terrestrial carnivore in southern South America is the puma (*Felis concolor*) (Valverde 1998). As well, the puma is an important *umbrella* species because of its large area requirements and its varied habitat use, especially in terms of connectivity (Valverde 1998, Beier 1993). Such a classification would allow a puma conservation strategy to assist in protecting a significant portion of the region's species diversity (Miller et al. 1999). An animal such as the puma may, with limits on hunting, do well in human impacted areas, emphasizing the need to identify species, such as the huemul, that are more sensitive to human activity in order to assure the proper monitoring and maintenance of ecological integrity in core reserve areas (Miller et al. 1999). The puma is, however, an extremely unpopular species in southern South America due to conflicts with livestock. As a convenient villain, the puma may not be a good *flagship* species, at least in the beginning of regional scale conservation advocacy as suggested by a focal species strategy. This big cat is considered vulnerable (CONAF 1999), and as a top carnivore its conservation is essential to maintaining ecological integrity in the region of study. The delicate promotion of puma conservation is a culturally and politically charged endeavor, but one whose success is key to maintaining ecosystem integrity. Therefore it is important to include the puma in a focal species strategy.

As evidence of the role that such carnivores fulfill in an ecosystem, it must be noted that the puma has an important predator-prey relationship with the huemul (*Hippocamelus bisulcus*), an endangered endemic deer species of Patagonia (Serret 2001, Diaz and Smith-Fleuck 2000, Frid 1999, Terborgh et al. 1999, Povilitis 1998, Frid 1994). There are two endemic deer species in the southern temperate forest: the huemul and the pudu. The *pudu* (*Pudu pudu*) is a miniature deer that inhabits the dense under story of the Valdivian Rainforest.
The pudu is considered vulnerable (Wilcox 1995), but because of successful *ex-situ* conservation efforts has not received as much international conservation attention as the huemul. The huemul, on the other hand, is a shy animal that is particularly sensitive to human impacts such as livestock grazing, logging, industrial development, and hunting (Povilitis 1998). It is a relatively selective browser, and is easily out-competed in grazing by non-native livestock such as cows, goats, and sheep (Serret 2001, Frid 1999, Povilitis 1998). It prefers steep and rocky terrain, but is also known to use old growth forest for shelter and sustenance during the winter season (Diaz and Smith-Fleuck 2000, Frid 1999, Povilitis 1998, Frid 1994). It is estimated that between 1500-2000 individuals of this endangered native deer survive, the majority in Chilean Patagonia, and with perhaps only 500 specimens in Argentina (Serret 2001, Diaz and Smith-Fleuck 2000, Povilitis 1998, FVSA 1998). The original range of the huemul is estimated to have extended southward from about 30 degrees south of the equator to 54 degrees south (Serret 2001, Povilitis 1998, FVSA 1998). The huemul is critically endangered in its last remaining populations in Central Chile (Povilitis 1998), and is rapidly losing habitat and numbers in the northern reaches of its current range in Northern Patagonia (Diaz and Smith-Fleuck 2000, CONAF 1999, Povilitis 1998, Valverde 1998).

Because of the crucial predator-prey relationship with the puma, the sensitive nature of the species, the critical state of its conservation in Central Chile, and the transboundary nature of this Patagonian deer, the huemul is suggested as a priority species in any focal species strategy launched in southern South America. It has been suggested that native ungulates play a key role in the dispersion of microbes in temperate forest landscapes (Pastor et al. 1988); though this might suggest that a deer such as the huemul could be considered a *keystone* species, there is a complete lack of data to support such a claim. On the other hand, due to the sensitivity of the huemul to human impacts, the huemul might be considered an *indicator* species, whose presence or absence may reflect the quality of the habitat for all human impact sensitive species. Due to its characteristic need of varied habitat requirements, the necessity of maintaining
and developing reliable connectivity between fragmented populations, and the predator-prey relationship with the puma, the huemul will make an appropriate *umbrella* species for conservation efforts in the southern Andes (Povilitis 1998).

### TABLE THREE: A Sample *SUITE OF SPECIES*

<table>
<thead>
<tr>
<th>SPECIES</th>
<th>FOCAL ROLE</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Huemul</em>-deer</td>
<td>Indicator, umbrella, and flagship species</td>
<td>Crucial predator-prey relationship with puma, varied habitat needs, sensitive to human impacts, flagship species extraordinaire.</td>
</tr>
<tr>
<td><em>Puma</em>-mountain lion</td>
<td>Keystone and umbrella species</td>
<td>Role as top carnivore, large area requirements, varied habitat use, biological corridor needs promote reserve system wide connectivity.</td>
</tr>
<tr>
<td><em>Nothofagus</em> spp.</td>
<td>Umbrella and flagship species</td>
<td>Broad corridors and large spatial needs to accommodate for climate change and UV radiation, well recognized genus, some species endangered.</td>
</tr>
<tr>
<td><em>Huillin</em>-river otter</td>
<td>Indicator and flagship species</td>
<td>River otters considered strong indicators for riparian system health, aquatic systems important for connectivity, recognizable mammal.</td>
</tr>
<tr>
<td><em>Concon</em>-owl</td>
<td>Indicator species</td>
<td>Old growth forest structure dependent, cavity nesting, inhabitant of mature forests, key avian predator.</td>
</tr>
<tr>
<td><em>Carpintero</em>-woodpecker</td>
<td>Indicator and flagship species</td>
<td>Well recognized forest species, inhabitant of mature forests, birds are able to use “islands” of intact habitat, indicator of old growth qualities.</td>
</tr>
<tr>
<td><em>Picaflor</em>-hummingbird</td>
<td>Keystone species</td>
<td>Pollinator, key role in ecosystem with high rate of mutualism, can use small patches of intact forest in already heavily impacted areas.</td>
</tr>
</tbody>
</table>
Most importantly, the Huemul joins the Andean Condor (*Vultur gryphus*) on the Chilean coat-of-arms. It is a heraldic animal that has an important cultural role in all of Chile and in Argentine Patagonia. The huemul is an *umbrella* and *indicator* species whose conservation planning will assist in making conservation oriented land use decisions throughout its current and historical range. This endangered deer species, unique to southern Chile and Argentina, is also a *flagship* species extraordinaire, an animal that could be considered the “point of the lance” (Bonacic 2002) of all conservation efforts in the southern Andes and coastal Patagonia. Studies have shown that more information is needed to fully understand the habitat needs of the huemul. Nevertheless, conservationists can confidently describe the seasonal changes in huemul habitat use, and the necessity of developing an integrated conservation strategy that incorporates a mosaic of core reserve areas, connectivity, and the seasonal habitat needs of this endangered species (Frid 1999, Povilitis 1998, Frid 1994). The charismatic potential of the huemul, coupled with its role as a large mammalian herbivore with varied habitat needs and endangered status, make this animal a critical member of any “suite of species” proposed for designing a transboundary reserve system strategy upon focal species theory.

The huemul, in conjunction with the puma, the *huillin*, the *Nothofagus* tree varieties, a trio of bird species such as the hummingbird *Sephanoides galerus*, the Magellanic woodpecker, and the *concon* (*Strix rufipes*), will star in this effective suite of species. All of these species contribute to a *focal species strategy* that would be effective in making tremendous positive steps towards the conservation of biodiversity in southern South America. The issue remains of how these various species habitats are being managed, conserved, and protected in the face of growing industrial and anthropogenic threats. Having elaborated on the natural science foundations for biodiversity conservation in the southern temperate forests, to continue the interdisciplinary investigation of reserve system design this study will now turn to the administrative and legal aspects of creating a regional conservation strategy.
Chapter 4

The Administrative-Legal Framework of Forest Protection in Southern Chile and Argentina

Though the participation in bilateral or multilateral agreements will involve voluntarily relinquishing a certain degree of national sovereignty in international legal affairs (Rogers and Moore 1995), for the purposes of this study the sovereignty and independence of Chile and Argentina are understood as a given. There are distinct differences in style, management, and context between the two nations that are reflected in how the conservation of the southern temperate forests is approached. Nevertheless, it should be noted that, since the resolution of conflict in the late 1970’s, Argentina and Chile have made significant strides in cooperative efforts along the length of their shared border, including the temperate and sub-Antarctic south. Advances in neighborly collaboration include affirming a bi-national environmental protection treaty. This is an encouraging sign for the prospects of conserving the temperate forests, because regional and international cooperation can facilitate actions that make a significant contribution to slowing down processes of extinction (Carrière 2000). Despite challenges, there are many opportunities in transboundary and regional approaches to conservation, the transborder stewardship of protected areas being one example in particular (Hamilton et al. 1998).

The importance of regional scale administrative cooperation and planning is emphasized in the fact that Chile and Argentina share the second largest block of remaining temperate frontier forest—that is, large tracts of relatively undisturbed forest—in the world (Bryant et al. 1997). Temperate forests are considered the most endangered frontier forests of all, and in Argentina and Chile it is considered that “not much time is left” to assure conservation of frontier forests in the southern temperate forests of these countries (Bryant et al. 1997). One hundred percent of Argentina’s remaining frontier forest, including temperate forests, is at risk of being lost, while in Chile, having already lost more than one half of its original frontier forest, just over three-fourths of the remaining frontier forest is
currently threatened (Bryant et al. 1997). Chile’s temperate forests are increasingly put at risk by logging to provide woodchips for export, by clearing and conversion to agriculture and exotic tree species plantations, and by tree cutting for fuel wood (Neira 2002, Bryant et al. 1997). Neighboring Argentina finds its temperate forests, even those protected in national or provincial parks, to be increasingly threatened by unmanaged logging, livestock grazing, and human caused forest fires (Sabatini and Rodriguez Iglesia 2001, Nebbia et al. 2000).

It is important to reiterate that this paper is based upon the premise that effective and necessary steps towards reducing threats to remaining intact primary forest are founded in transboundary cooperation and regional scale planning (Carrière 2000, Noss and Cooperrider 1994). As well, it will be and has been noted throughout this paper that the protected area systems in both Chile and Argentina are threatened, putting at risk their capacity to fulfill the long term objectives of protecting biodiversity. As an example, in the austral summer of 2002 alone there were significant fires in protected areas in both nations. Fire can be ecologically devastating as natural occurring fire is a rare disturbance mechanism in the southern temperate forests, and more than 95 percent of fires are human caused (Donoso 1981, Donoso 1996). Despite the seriousness of these catastrophic events very few planners are looking at the impacts at regional scales or in a transboundary context. This critical conservation situation and challenging transboundary context raises many questions concerning the resolution of difficulties in the management and administration of forestlands, both intervened and still undisturbed, in these neighboring southern cone nations.

The differences and similarities between Argentina and Chile are outlined in constitutional codification of citizens’ rights to a clean and healthy environment. In Argentina it is recognized that the existence of a “healthy environment.... apt for human development and sufficient that productive activities satisfy present necessities without compromising future generations” is a fundamental right guaranteed in the Argentine constitution (Dugo 2000). Just on the other side of the Andes, the Chilean constitution guarantees the right to “live in an environment free of contamination” and that “it is the duty of the state to be vigilant in order
that this right not be affected, and to direct the preservation of nature" (CONAF 1999, Kokisch Mourgues 2000, Ramirez Sierra 2001). Both nations have the legal structures and constitutional base that could facilitate the protection of biodiversity, yet there are issues with the implementation and enforcement of environmental law that impede the realization of such goals (Neira et al. 2002, Dugo 2000, Kokisch Mourgues 2000). These two nations, from their constitutions to the composition of their land management agencies, have distinct language, mandates, agencies, and authority for the management of land, the conservation of biodiversity, and the implementation of decision making processes for carrying out these responsibilities. Still, the signing of a bi-national environmental agreement between the two nations in 1991 (Videla pers. com. 2002, Dugo 2000) is indicative of existing potential for increasing conservation cooperation, and is a crucial legal administrative angle to consider in the promotion of transboundary conservation and reserve system design. Less optimistically, the lack of activity in the ten years that have passed since the agreement was signed are also indicative of how little attention contemporary governments give to international environmental accords.

A sort of introductory “lexicon” is provided in this chapter, as a means of providing a basic glossary on institutional and administrative terms and context. To implement regional and transboundary solutions it is necessary to have a clear initial understanding, in administrative and legal terms, of what lands are actually in question, and of how land is managed on both sides of the border. This chapter is not exhaustive, but it will cover many administrative and legal issues pertaining to public conservation strategies and initiatives in both nations individually. A brief look at private conservation initiatives—conservation oriented land acquisition and ecosystem protection projects financed and organized by private interests—in the two countries will follow. The chapter continues by investigating the bi-lateral transboundary context and the multi-lateral international agreement context, including an exploration of highly pertinent material included in the Protocol for the Protection of the Antarctic Environment. This chapter won’t touch on economic or social context as it might, saving that for Chapter 5,
“Buffering Strategies: Responding to the Challenges of Sustainability.” The focus here is on administrative and legal details, describing the framework and dynamics of public and private land management and conservation in southern South America. In conclusion it is noted that there are legal avenues to promote a regional reserve system, but that the prospects of an international treaty establishing the Gondwana Forests Sanctuary are currently slim to non-existent.

Privatization, Unfulfilled Representation, and Parks Without Enacted Legislation: Global Treasures at Administrative Risk in Chile

Chile is divided into Administrative Regions numbered I through XII running from north to south. Chile is a nation 4,000 kilometers long with a surface area of more than 75 million hectares (without counting Antarctica), of which much is in the arid north. The temperate forests being discussed in this paper begin in Region VIII, and continue south through Region XII. Chile is a Constitutional Republic with a bi-cameral legislative body. Though this elected National Congress was reinstated with the return of democracy in 1990, Chilean voters still have no say over regional or local political leaders other than the mayors of municipalities. After voting for Presidential candidates, national congressional deputies and senators, and local mayors, Chilean voters have very little participation in selecting regional political leaders and administrators. This structure is left over from the military dictatorship that controlled Chile from 1973 until late in 1989. Though there are many social and cultural remnants of the dictatorship in land management processes and agencies, there exists nevertheless a clamoring for increased public participation in land management decisions. This call for increased participation was a driving force behind institutional efforts to perform a survey to determine the amount of forested lands remaining in Chile, in order that actors involved could have a true sense of what was at stake (Neira 2002).

Between 1994 and 1997, with the support of the World Bank in the form of US $3.5 million, the Chilean forestry agency (CONAF) and the Chilean
environmental commission (CONAMA) enlisted the help of universities to carry out a land register and evaluation of Chile’s native vegetation resources (Neira 2002, Lara 1998). Including second growth and *bosque achaparrado*—degraded and grazed forest lands—the land survey was able to arrive at a total of nearly 13.5 million hectares of native forest remaining in Chile (CONAF-CONAMA 1999, Lara 1998). Of these 13.5 million hectares, just over 3 million are *bosque achaparrado*, while nearly 6 million are considered to be adult forest, that is forest with higher productivity capacity (CONAF-CONAMA 1999, Lara 1998). Even more revealing is that applying a rigorous criterion qualifies only 2.1 million hectares as mature forest (Lara 1998). In comparison, more than 2 million hectares of land that were once native forest have been converted over time to exotic species tree plantations (CONAF-CONAMA 1999, Lara 1998).

These figures reveal both the current status of conservation of the native forests in Chile and the dynamic surrounding administration of this forest resource. The government and World Bank figures above are distinct from an independent study carried out by Global Forest Watch-Chile (GFW-Chile) of the World Resources Institute. In the GFW-Chile report, “frontier forest” is defined as large tracts of relatively undisturbed forest, of a minimum 5,000-hectare patch size, that offer the ecological and biological characteristics that facilitate the survival of all native species (Neira 2002). The survey and mapping project of GFW-Chile classified nearly 4.5 million hectares, or almost 34 percent of native forest in Chile, that qualify as frontier forest (Neira 2002). The distribution of frontier and/or adult forest is shown by each study to be skewed towards the south. For instance, Region XI contains the largest expanse of native forest, with 36 percent of all native forest area and 40 percent of all frontier forests (Neira 2002). Due to high degree of fragmentation in the north, there is almost no frontier forest remaining and the highest concentration of frontier forest is in the three southernmost regions, where more than 80 percent of Chile’s frontier forests are located (Neira 2002).

Currently, about one-third of Chile’s 75 million hectares belongs to the state (Bienes Nacionales 1999). Of this nearly 24 million hectares of *tierra fiscal,*
about 17 million hectares are in Regions X through XII (Bienes Nacionales 1999). Not all *tierra fiscal* is managed by a state agency. A large percentage of the state held lands in Regions XI and XII are actually dedicated to the protected area system (Bienes Nacionales 1999). Much of the most biologically important forestland is in the coastal range of Region X where protected areas are rare and small (Neira 2002).

The land management situation is complicated by the fact that besides the remaining *tierra fiscal*, much of the original native forest cover in Chile belongs to corporations and private landowners (Neira 2002). This trend accelerated in 1974, shortly after the military dictatorship took power in Chile, when direct state involvement with the forestry sector was markedly reduced (Neira 2002). At about this time a privatization process was initiated, passing many state forestlands into the private sector (Neira 2002, Collins and Lear 1995). In the period from 1980-89 alone, aside from the initial rush of privatization in the 1970’s (Collins and Lear 1995), more than 1 million hectares of state land in the southern-forested regions were sold to private owners (Bienes Nacionales 1999).

This trend of privatization is embodied in the Corporacion Nacional Forestal (CONAF), which is the national forestry agency. CONAF, charged with overseeing forestry management on private and public lands as well as the care of the parks and reserves in the “national system of protected wildlands” (SNASPE) is described as a “corporation of private right with attributes of a public agency—as such it is not properly a public organism” (CODEFF 1999). The economic philosophy which has accompanied the privatization of public lands and public agencies has directed agencies like CONAF to enter agreements in which their revenue is tied directly to the exports of products such as native forest wood chips, creating a “dynamic whereby any significant curtailment of the felling of native forests would reduce its own revenues” (Collins and Lear 1995). The necessity of finding private funding in order to realize activities is a serious threat to the capacity of the agency to maintain continuity in its work to manage protected areas as well as oversee forestry management (CODEFF 1999).
In all actuality, the past mischaracterization of CONAF as “comparable to the US Forest Service and the US National Park Service combined” (Wilcox 1995) has been a dangerous and impractical interpretation of the key forest agency in Chile. This importation of northern agency definitions to a distinct situation distracts conservationists from the real mandate of CONAF, which is to further the exotic species forestry model and maximize the exploitation of forest resources, regardless of participation in conservation of threatened species, identifying priority conservation areas (CONAF 1999, CONAF 1996), and the management of protected areas (Fierro pers comm. 2002, Calcagni 1999, CODEFF 1999). There are repeated examples of dedicated conservation minded professionals attempting to steward their nations native patrimony as employees of CONAF. Respectfully, therefore, throughout the remainder of this study the private nature of CONAF will be emphasized, as an attempt to demystify conceptions about the agency, and to clarify realistic strategies for the long-term protection of forestlands and biodiversity in the southern temperate forests, including the valorización— the enhancement of the value—and stewardship of natural areas and native forests. There is growing concern about the management of forestry activities in Chile by CONAF, and it is becoming more apparent that only a small percentage of forestry activities are adequately managed (Neira 2002, Lara et al. 1995).

The branch of CONAF that manages the *Sistema Nacional de Areas Silvestres Protegidas del Estado* (SNASPE) is known as *Patrimonio Silvestre*—Wild Patrimony (Tacon et al. 2001, CODEFF 1999). SNASPE, designed according to guidelines included in the Convention on Nature Protection and Wild Life Preservation in the Western Hemisphere of 1940 (Washington Convention), defines four main categories of protection as described below (from Neira 2002, CODEFF 1999, Rogers and Moore 1995):

- National Parks, which are areas with unique or representative ecosystems that are in general minimally altered and intended to preserve examples of the
natural environment and scenic areas, and to maintain ecological integrity of the ecosystem protected.

- **National Reserves**, which are areas where natural areas are to be managed and conserved in order not to degrade the soil or resources there in, yet allowing exploitation nonetheless.

- **National Monuments**, which are small areas designated for protection because of outstanding value due to their rarity, aesthetic qualities, or cultural significance.

- **Virgin Area Reserves**, which are meant to protect areas that have pristine ecological and natural qualities. There has never been a Virgin Area Reserve created in Chile.

Just over 18 percent of the land surface of Chile is actually dedicated to SNASPE (Neira 2002, Giusti 2001, CODEFF 1999). Nearly 70 percent of this protected land is in the far southern regions, which does bode well for the sub-Antarctic temperate forests (Neira 2002). Nonetheless, 40 percent of this land is actually glaciers and alpine terrain (Giusti 2001), while only 27 percent of the remaining frontier forests are actually included in SNASPE (Neira 2002). Alongside these shortcomings are the fact that there is a lack of representation of different ecosystems and forest types included for protection in SNASPE, being especially significant the lack of protected areas in the zone of highest biological diversity: the Andes of Region VIII and the coastal ranges of Regions VIII, IX, and X (Neira 2002, CODEFF 1999, Calcagni 1999, Armesto et al. 1998, Moreira et al. 1998, Povilitis 1998, Armesto et al. 1994). There are also grave concerns about the fragmentation and isolation of protected areas, the invasion of exotic species in protected areas, and their growing susceptibility to catastrophic disturbance in the form of human caused forest fires (Pauchard 2001, Pauchard 1999, CODEFF 1999, Calcagni 1999, Moreira 1998).

Important for focal species strategies is the concern that only 45 percent of areas in SNASPE are actually sufficient to maintain carnivores such as the puma (Calcagni 1999), and that in the Tenth Region there is not one area belonging to
SNASPE that of its own accord could provide minimal viable habitat for the long term conservation of either the puma or the huemul (Tacon et al. 2001). This fact should not distract from the potential for linking public and private protected areas together in regional management that would provide for 300,000 to 1 million hectares of connected habitat, and even more if transboundary strategies with Argentina could be implemented. Nevertheless, along with ecological weaknesses, administration of the financing, management, and personnel for SNASPE is a serious concern; examples include the fact that as of 1999 less than 50 percent of the entities managed in SNASPE actually had Management Plans, and that one-third of the protected areas have no year round personnel (CODEFF 1999, Moreira et al. 1998). While it must be readily admitted that Chilean protected areas are national and global treasures, there is strong evidence that the SNASPE is in dire need of reinvigoration and expansion in order that the long term objectives of nature protection and the conservation of biodiversity might be realized.

That reinvigoration could come in the form of parliamentary approval of laws that oversee and provide for the legal existence of management agencies and the SNASPE, including even putting Patrimonio Silvestre in an agency distinct from CONAF (Calcagni 1999). The time has arrived for legislative action, regardless of political motive. Written and presented in 1984, at a time when there was no Congress due to its dissolution by the military dictatorship, the laws that implement CONAF (Law 18,348 CONAF and Protection of Renewable Natural Resources) and the SNASPE (Law 18,362 National System of Protected Wildlands) have never been approved by the Chilean Congress, though they continue to function as part of the Ministry of Agriculture (Neira 2002, CODEFF 1999, Fuentes Olivares 1999).

This vagueness surrounding the ongoing operation of institutions that lack institucionalidad provides insight to the pure magic realism of Latin American nature conservation that no academic thesis will ever quantify. That the treasured national parks and protected areas are half private in their administration, are managed by laws that have never been legislatively approved, and are
bureaucratically enclosed in a private government corporation whose true mission is the growth of the plantation forestry model is not the commentary that most tourist guides provide. The evidence is stark, though, and great respect is due the people on the ground working for CONAF and keeping the *silvestre* a real priority.

Although the *Proyecto de Ley del Bosque Nativo*—the Native Forests Law meant to guide native forest management—has been languishing in the National Congress for more than a decade (Neira 2002, GAIN 2001), there is other legislation that promotes conservation and the protection of natural resources and species. A short list of examples is provided here (from Neira 2002, Tacon et al. 2001, CODEFF 1999, Calcagni 1999, Fuentes Olivares 1999):

- Law 17,288 on National Monuments allows for specific species to be protected national monuments. Both the millennial *alerce* and *araucaria* have this status, amongst other species. This law also allows for the creation of Nature Sanctuaries, to be addressed again below in discussion of private conservation initiatives.
- Law 18,378 includes language concerning Areas of Tourism Interest and Protection that protects the cutting of trees along byways and waterways. This as well has particular applications in private conservation initiatives.
- Article 5 of the original Forest Law of 1931 prohibits logging near wetlands and slopes steeper than 45 degrees.
- Law 19,473 on Hunting prohibits the hunting of threatened, vulnerable, and endangered species. This includes the puma and the Huemul.

Nearly four years after the passing of the dictatorship, a very important piece of legislation was passed in 1993, providing the potential for a legal structure that might give substance to the elements of public participation in decision making that are essential to sustainability (Oelshlaeger and Rozzi 1998, Castillo Sanchez 1998). Law 19,300 on the General Environment/Environmental Framework (*Bases Generales del Medio Ambiente*) confirms the constitutional
rights to live in a pollution free environment (Castillo Sanchez 1998). This legislation also proposes to conserve evolutionary processes, protect environmental patrimony, protect ecosystems, and control the deterioration of the environment (Castillo Sanchez 1998). The primary function of Law 19,300 is to evaluate land management decisions by implementing a system of Environmental Impact Assessments (EIA) to be administered by the Comision Nacional del Medio Ambiente (CONAMA), which is the national environmental commission. In each region there is also an environmental commission, the Comision Regional del Medio Ambiente (COREMA), overseen by, yet still administratively separate from CONAMA (Castillo Sanchez 1998). The COREMA of each region actually retains a fairly significant role, without much counterbalance, in the outcome of the EIA process (Programa Chile Sustentable 2001, Castillo Sanchez 1998).

Though there is general agreement that this legislation is a positive step forward, the lack of public participation and concerns about how projects are actually reviewed and accepted are issues that the Chilean environmental and social justice community continues to address (Programa Chile Sustentable 2001, Castillo Sanchez 1998).

CONAMA is an important agency that has responsibility for certain projects such as the advancement of the national strategy on the conservation of biodiversity, on which little progress has been made in the last years. Events such as the retirement of noted botanist Adrianna Hoffman from the director position at CONAMA suggest that the agency may not be responding to conservation minded management. Nevertheless, conservation planning must consider the administrative context in which strategies are to be realized, especially when that context may be antagonistic to conservation. There are details of other legal issues particular to Chile that will be discussed throughout the rest of this paper, giving insight on opportunities and challenges to securing the conservation of biodiversity in the temperate south. First though, a look at the protected areas of Argentina will develop the transboundary perspective for the southern temperate forests.
From Parks Guarding Borders to Contiguous Eco-Corridor: Hopeful Land Management in the Argentine Patagonian Andes

The southern Andes of Argentina, the long thin strip of the Andino-Patagonico, comprise a much smaller geographical area than the respective temperate forest area in Chile. This ecoregion, known in Argentina as the sub-Antarctic Patagonian Andes Forest, runs along the crest and eastern slopes of the Andes from northern Patagonia south clear to the island of Tierra del Fuego (APN/IUCN 1998). It is also possible to distinguish between the bosque andino-patagonico of the northern Patagonian Andes, and the sub-Antarctic forests of southern Patagonia and Tierra del Fuego (APN/IUCN 1998). For the purposes of this discussion this distinction will be noted when necessary, otherwise references to the sub-Antarctic forests will include the entire strip of southern temperate forest in Argentine Patagonia. This region is crucially important for the conservation of the Southern temperate forests, as it is a sort of backdoor to the heart of the temperate forest in Chile (Veblen et al. 1996). It is also under the influence of important eco-tone qualities attributed to the ecological transition zone of the forest with the Patagonian steppe, providing unique qualities of biodiversity (Veblen et al. 1996). The sub-Antarctic forests of Argentina are a less extensive area of concern than the Chilean forest. This does not lessen their regional and global ecological importance.

Argentina has a distinct political structure from Chile, in that the nation is divided into provinces, each of which has an elected governor and legislature (Valls 1999). The political strength of the provinces is demonstrated in that there are land management agencies within each province as well as in the federal government of Argentina, providing a far more complex administrative matrix within which to realize conservation strategies. The temperate forests of Argentina are found in the western part of the provinces of Neuquen, Rio Negro, Chubut, Santa Cruz, and Tierra del Fuego, running from north to south along the Andes. Protected areas in the temperate forest region of Argentina are administered by the federal government, the provincial governments,
municipal governments, providing many more options for securing protection, yet presenting many challenges in efforts to integrate protected area management on a regional scale (Serret 2001, Valls 1999). Influenced by the history of the national parks and other management regimes in the region, new opportunities for conservation will reflect this complex structure.

A distinct characteristic of park policy and history is that from the beginning of the century up through the end of the border conflicts with Chile in the late 1970's, Argentina's national parks establishment and management in the Patagonian Andes largely reflected geopolitical strategy (Sabatini and Rodriguez Iglesia 2001). The establishment of national parks along the Patagonian border with Chile, beginning with the creation of Nahuel Huapi National Park in 1934 (APN/IUCN 1998) and continuing with 4 other parks in 1937 (Sabatini and Rodriguez Iglesia 2001, APN/IUCN 1998) was largely an effort to occupy territory and develop a national presence in a region that was otherwise lacking federal governing (Sabatini and Rodriguez Iglesia 2001). Argentina was actually the third country in the Americas to establish a national park, when the initial small area that would be expanded in the establishment of Nahuel Huapi was declared a park in 1904 (Sabatini and Rodriguez Iglesia 2001). Though there were no ecological criteria applied to establishing these parks, the happenstance of history has provided a firm basis for temperate forest conservation in Argentina. Contemporary parks policy has placed the conservation of biodiversity, environmental education, and the protection of water resources as main objectives in the management of Argentine national parks for the last 15 years (Sabatini and Rodriguez Iglesia 2001).

This largely bureaucratic stance has been contradicted by what continues to occur on the ground. Threats to the already established national parks and provincial protected areas in the form of industrial projects such as gas pipe-lines, the invasion of exotic species, poaching and illegal hunting, extensive unregulated livestock grazing, and human caused fires, are putting the parks at increasing risk (Sabatini and Rodriguez Iglesia 2001, Nebbia et al. 1999, APN/IUCN 1998). In the austral summer of 2002 alone thousands of acres of forest in both provincial
and national parks were catastrophically burned by human caused fires. There are grave concerns about the management of the national parks, and the ability of these areas to continue to obtain their stated objectives (Sabatini and Rodriguez Iglesia 2001, Beletzky 2001).

Land surveys that have been completed in the last 5 years will assist in an analysis of the status of the temperate forests and the extent of the protected areas in the sub-Antarctic forested area. One of these surveys, the Vegetation of the Valdivian Forest Ecoregion, is a shining example of transboundary conservation cooperation and analysis (UACh/APN/FVSA 1999). This analysis of forest and vegetation cover for the temperate forest region between 37 degrees south of the equator and 47 degrees south of the equator is one of the first attempts at analyzing the conservation status of the southern temperate forests, though it does not examine the far south of Patagonia and Tierra del Fuego (UACh/APN/FVSA 1999). By this analysis, Argentina is host to 2.1 million hectares of native woods, more than half of it being tree-line nothofagus lenga forest (UACh/APN/FVSA 1999). Of this forested area, more than 900,000 hectares are actually protected in parks, numerically demonstrating a very high rate of protection in Argentina's temperate forests compared to Chile (UACh/APN/FVSA 1999).

A study done of the coverage of national parks in Argentina also confirms that this rate of protection of the southern temperate forests is relatively exceptional, as no other ecoregion in Argentina comes anywhere close to having over 30 percent of its surface area included in national and/or provincial parks (APN/IUCN 1998). This is not to say that the protected areas in the region are not without their drawbacks and risks, but it does recognize the tremendous conservation opportunity manifest in such a significant representation of temperate forests in protected areas. In the study of national parks the entire sub-Antarctic region is assessed, concluding that actually 2.1 million hectares of the 6.6 million hectare surface area of the entire sub-Antarctic Patagonian Andes region is protected in national and provincial parks (APN/IUCN 1998). Of this 2.1 million hectares, just short of 2 million hectares are actually covered in the federal national park system, and an as yet undetermined amount is actually...
temperate forest (APN/IUCN 1998). Comparing numbers from the two studies, a conservative assumption is to state that about 1 million hectares of southern temperate forest are protected in Argentina, by the provincial agencies and the Administracion de Parques Nacionales—the National Parks Administration (APN).

Categories of protection in the Argentine park system are designated by categories that, as in Chile, were initially defined by the Washington Convention of 1940, these being national parks, national reserves, and natural monuments (Sabatini and Rodriguez Iglesia 2001, Dugo 2000, APN 1999, Valls 1999, Rogers and Moore 1995). These standards were established with the passage of Law 22,351, but were enhanced when “strict natural reserves” were defined in 1993 in decree 2148/90 (Sabatini and Rodriguez Iglesia 2001, Dugo 2000). This new designation did not mean that new areas were protected as much as it meant that previously protected areas in the national parks were redesigned as strict reserves, where visitation is largely discouraged (Sabatini and Rodrgiuez Iglesia 2001). This designation of “strict reserves” is close to the meaning of “virgin area” as promoted in the Washington Convention of 1940 (Rogers and Moore 1995).

Achieving environmental protection may demand a change in social values, yet legislative modification and greater public participation are the processes at the bottom of this change (Dugo 2001). In Argentina, aside from the legislation referring to protected areas there exists a series of laws that may promote the conservation of biodiversity through a focal species and reserve system design strategy. One of the best examples is the protection afforded the huemul (from Serret 2001):

- The huemul has some policy protection under a resolution by the Secretary of Agriculture, categorized as “vulnerable” to extinction (Res. 144/83).
- The huemul is afforded special protection within the National Parks and Reserves (Law 22,351/80).
- The APN has based a resolution declaring the huemul a species of special value (Res. 180/94).
- The huemul has been declared a National Natural Monument, protecting the animal from hunting (Law 24.702/96).
- The huemul has been declared a Provincial Natural Monument in the Provinces of Santa Cruz, Rio Negro, and Chubut. This is largely to protect the huemul from hunting.
- The municipality of Lago Puelo has declared the huemul to be of municipal interest (Decl. 117/98).

The primary angle of species protection is that the huemul is protected from hunting. There is no legislation that would strictly protect the habitat of the huemul. Observation does show that there is legal protection for this endangered species (Serret 2001). Concerns have been raised, though, as to the “application” of these legal norms (Serret 2001). One of the concerns relates directly to the challenges and opportunities present in the diverse administrative matrix of Argentina’s Patagonian provinces, that being a lack of consensus in the genesis of these legal norms and an “excess or superimposition” of the norms (Serret 2001). If the huemul is afforded so much protection legally, productive tactics for implementing that protection, beyond a police enforcement of the hunting prohibition supported by these laws, needs to be identified (Serret 2001). This challenge is the essence of the inquiry into administrative and legal issues that is necessary for understanding conservation in a transboundary context.

There are two prime examples of how this regional inter-provincial and federal government integration of conservation administration are being pursued in Argentine Patagonia. One is the National Plan for the Huemul (APN 2001), and the other is the Northern Patagonian Andes Ecoregional Corridor (Paz Berreto 2001). The Ecoregional Corridor proposal has its roots in the Gondwana Forests Sanctuary vision, being largely an adaptation of the corridor proposal designed by Lucas Chiappe of the NGO Proyecto Lemu. Both examples have received a great deal of support from the Association of Park Rangers of APN, and both are based in administering the protected areas in the bosque andino patagonico as a connected network, creating a contiguous system of national,
provincial, and municipal protected areas and conservation oriented legislation that will forward the care of the temperate forest, endangered species, and biodiversity (APN 2001, Paz Berreto 2001). The Argentine National Plan for the Huemul is still in the formative stages, but expresses the need for regional scale protected area planning in order to protect the huemul (APN 2001). Building upon the significant national parks of the Argentine Patagonian Andes, the Ecoregional Corridor proposal is to connect the parks by establishing and stewarding provincial and municipal protected areas to fill the gaps existing between the already established national parks, therefore creating a larger contiguous protected area system (Paz Berreto 2001).

Resolutions passed in various municipal, provincial, and national legislative committees’ favoring the establishment of such a regional scale network of protected areas provide extra and rarely recognized legitimacy to the corridor proposal (Paz Berreto 2001). These resolutions are largely symbolic and have not dedicated any financial or agency resources to the creation of these networks, though they have helped in creating political momentum. Implementation of the Ecoregional Corridor would be a tremendously important step towards building a regional scale transboundary conservation plan based on a connected reserve system. Despite political and public support of the proposals, the lack of financing and the extremely dire economic straits of the Argentine government restrict the immediate benefit of this favorable administrative context. International support could be crucial in supporting these diverse efforts, especially in integrating these grassroots administrative efforts with private conservation efforts.

**Private Conservation Initiatives**

With every passing year the concept of world heritage, or the common heritage of humankind, is a stronger theme of international conservation efforts (Olembo 1989). The growth of this concept is fomenting a change in land management and natural resource conservation processes, as well as a change in
property ownership regulations. It is proposed in some arenas that effective long
term conservation planning will require profound changes in power structures and
power distribution, which includes the classical legal foundations of land
ownership, though this seems to still be in the distant future (Olembo 1989). A
practical response in the meantime, amidst the waves of privatization driving
dominant administrative and economic theory in many nations, including Chile
and Argentina, is to invest privately in conservation-oriented projects and land
acquisition for habitat protection purposes. Such investment is largely
philanthropic, though there are arguments to be made that the returns on
conservation investments could be invaluable in an ecological sense, and even
profitable in the long-term in an economic sense, creating an air of investment as

The investment of private resources in land acquisition for conservation
purposes, a growing phenomena globally, is often seen in Chile and Argentina as
being a private response to fulfilling a societal and, more importantly, a biological
need to protect habitat (Calcagni 1999, Villarroel 1992). This need to protect
habitat is recognized as a responsibility that governments either cannot or choose
not to fulfill to the extent that is necessary for the conservation of biodiversity
(Calcagni 1999, Villarroel 1992). It was this recognition, especially in Chile, that
created the momentum for an explosion of private conservation initiatives in the
southern temperate forests (CODEFF 1999). The phenomena of private
conservation initiatives, especially the acquisition of land, emphasize the reality
that property ownership and management are the context within which the
practical protection of biodiversity is based. This also reveals how private
organizations, businesses, and individuals can play a key role in conservation; in
fact, their participation is regarded as essential (CODEFF 1999, Armesto et al.
foreign or domestic, in land conservation carries with it many questions of
property rights and legal bases of property ownership. Therefore, private
conservation initiatives, especially the acquisition of sizeable tracts of land, have
the potential to be extremely controversial. Private conservation is a commitment
of professional and economical resources that cannot be taken lightly, with few
short-term rewards. Such initiatives are the cornerstone of building connectivity
in a regional scale system of protected areas in nations like Chile where the
governments cannot or choose not to fulfill their responsibilities (Villarroel 1992).

The Chilean organization Centro de Investigacion y Planificacion del Medio
Ambiente (CIPMA) completed a national survey of private conservation
initiatives in which the different projects were categorized according to their
focus (Sepulveda et al. 1998). The survey is valuable in that the categories
provide insight into the diversity of project types that make up private
conservation in the Chilean perspective. The main categories were Land
Conservation, Conservation of Species and Ecosystems, Ex-Situ Conservation,
and Donation of Material and Financial Resources (CODEFF 1999). Each of
these were divided again into categories as follows (from CODEFF 1999,
Sepulveda et al. 1998):

- Land Conservation includes the creation of parks and private reserves,
  conservation communities, ecotourism projects, donation of lands and
  holdings to the SNASPE, and the private administration of state conservation
  lands.
- Conservation of Species and Ecosystems includes the protection of forests,
  watersheds, wetlands, and coastal zones, the protection of species, and
  ecosystem restoration.
- Ex-Situ Conservation Initiatives are considered to be projects such as
  botanical gardens, seed banks, native plant nurseries, and wildlife
  rehabilitation and reproduction centers.
- Donations of Material and Financial Resources can occur in the form of
  financing of private reserves, of species protection programs, financing the
  actual management of the different units of the SNASPE, and the actual
  donation of equipment and infrastructure to the SNASPE.
This exploration of various types of private conservation initiatives is helpful in that it broadens the definition of what different strategies are available to explore. It is possible to imagine collaboration with national parks, investing in key land holdings, and developing native species nurseries as all being important and valid private conservation initiatives. There are other roles that private investment and interest can fulfill in promoting conservation, the introduction of concepts of sustainability to production practices being one of the most important of them, alongside the support of organizations that will participate actively in the national systems of protected areas (Calcagni et al. 1999).

In Argentina, the legality of establishing private conservation reserves or protected areas is a largely unexplored realm that has only recently received much attention. On the other side of the Andes, in Chile, there exists more than a decade of discussion on how to define a legal structure for private conservation initiatives (CODEFF 1999). Though the Environmental Framework Law 19.300 mentions private conservation initiatives and their crucial importance in both ecological and economic terms, the law fails to fully define a legal framework for their implementation (Castillo Sanchez 1998). Chilean conservationists have been waiting for a decade for the National Congress to effectively address the concepts of conservation easements and private protected areas (CODEFF 1999). Amongst various mechanisms, one that has received a fair amount of attention is the language of the Law 17.288 of National Monuments that addresses the establishment of Santuarios de la Naturaleza, Nature Sanctuaries (CODEFF 1999). By the law, a Nature Sanctuary would be those terrestrial or marine sites that offer special possibilities for scientific studies, or those that possess "natural formations" whose conservation is in the interest of science or the Chilean State (CODEFF 1999). The owner of the land would not lose their title to the land, but the custody of a Nature Sanctuary is subject to the council of the Ministry of Education, which oversees the management of National Monuments (CODEFF 1999). Several important private conservation initiatives have received Nature Sanctuary designation, though others have not; there are opportunities to be pursued through this mechanism. The Nature Sanctuary strategy does still have
grave weaknesses, namely the subjugation of a Nature Sanctuary application to intense political scrutiny and manipulation, especially if the holding in question is rich in natural resources (CODEFF 1999).

The importance of *private conservation initiatives* cannot be underestimated. Taking a focal species strategy into consideration reemphasizes this importance. The huemul is a species whose habitat is protected in several private protected areas through the length of Southern Chile and Argentina. These initiatives include the CODEFF and Nature Conservancy holding *Los Huemules del Niblinto* in Central Chile, the *Parque Pumalin* project just south of Puerto Môntt in the Tenth Region, and the recently established *Cabo Leon* holding of Fundacion Yendagaia on Isla Riesgo in Magellanes. The *Huemules del Niblinto* project is a prime example of how private and government conservation efforts are attempting to integrate their holdings; in the effort to mitigate the impacts of a natural gas pipeline on rare Huemul habitat in Central Chile, the Chilean government was granted just over 2,000 hectares of private land adjacent to the *Huemules del Niblinto* conservation holding, creating a joint private-public protected area of nearly 10,000 hectares (CODEFF 1999). This reflects the efforts of the Chilean conservation NGO CODEFF to establish a Network of Private Protected Areas (RAPP). The network is intended to help private conservationists gain access to the technical and legal help that is necessary to integrate *private conservation initiatives* into a larger regional scale vision for biodiversity conservation that takes both public and private efforts into consideration (CODEFF 1999).

There is an undeniable strategic importance of private initiatives, even if crucial legal hurdles have yet to be overcome (CODEFF 1999, Armesto et al. 1994, Weber 1992, Villarroel 1992). In all actuality, *private conservation initiatives* in the southern temperate forests of South America are so important to the conservation of biodiversity that they merit their own book. In the interest of providing an interdisciplinary approach to conservation planning in a transboundary context, this study will only provide an introductory analysis of the legal framework of private conservation. Nevertheless, the importance of such
efforts cannot be overstated, especially when seen in the light of bilateral and multilateral legal contexts, which is the subject addressed next.

The Southern Cone and International Environmental Diplomacy: Bilateral and Multilateral Legal Mechanisms for Conservation

In 1978, after a peace brokered by the Vatican to quell rising tensions due to border disputes, Chile and Argentina signed one of their first bilateral treaties, the Treaty of Peace and Friendship (Videla 2002). This launched a series of efforts at designing bilateral mechanisms to achieve concrete bilateral action, culminating in the Treaty of Protection of the Environment between Chile and Argentina on August 2, 1991 (Videla 2002). This bilateral treaty is perceived as a sort of "umbrella treaty," under which more specific agreements can be forged (Videla 2002). For instance, in early 2002 it was hoped that before the year was out Chile and Argentina would have signed a bilateral agreement for the protection of wildlife and flora (Videla 2002).

The Treaty of Protection of the Environment was written and signed with the objective of launching coordinated actions in the material of the protection, preservation, conservation, and cleaning up of the environment, though both parties agreed that their environmental politics would be "in the service of man" (Videla 2002). Though the treaty does not directly address endangered species, there is agreement that environmental policy should pay particular attention to native species, and mentions the protection of biological diversity, and specifically the adequate management of parks and protected areas for in-situ conservation, as one of the primary themes that the treaty is meant to address (Videla 2002).

The means by which such objectives could be achieved are outlined in the treaty (Videla 2002). They include agreeing to additional specific protocols, the exchange of technical and scientific information, promoting economic and technological collaboration in the field of environmental protection, and the organization of bilateral seminars and symposiums for scientists, professionals,
and experts (Videla 2002). The institutional structure of the treaty is realized under the Chilean-Argentinean Bi-national Commission, with a Sub-Commission that will promote and coordinate the execution of the Environmental Protection Treaty, managed under the Ministries of Foreign Relations of the two nations, and including representatives from the appropriate regional and provincial governments (Videla 2002). One of the primary examples of developing shared environmental policy objectives as outlined in the treaty are the biannual meetings concerning the conservation of the huemul, the most recent of which took place in April 2002. This meeting was considered by many participants to have been a grand disappointment, spotlighting the weakness of state actors in their commitment to realizing national, bilateral, and international conservation mandates. It is apparent that the bilateral treaty is a fairly general tool that could be used to develop specific protocols with strong, protection oriented, bilaterally shared legal language, but only if the political momentum lent itself to such applications. Importantly, this bilateral treaty could be an important mechanism for securing binational cooperation on focal species strategies.

The Chilean-Argentine Environmental Protection Treaty has conservation potential that is reinforced by several multilateral environmental agreements (MEA). There are serious questions about the effective implementation and enforcement of international law that considers the protection of natural resources, wildlife, and other qualities of unindustrialized nature (Lyster 1985). Though it is rare that states can be compelled to perform their legal obligations as outlined in an MEA, due to the lack of enforcement in international law compared to domestic law, there are organizational and structural approaches to the establishment of MEA’s that can facilitate their compliance (Lyster 1985). Unfortunately, there is great concern after the World Summit on Sustainable Development in Johannesburg in August 2002 that MEA’s will be subjected to reevaluation and ultimate subordination to international trade law as established through the Doha Ministerial of the World Trade Organization in November 2001. The failure of many powerful governmental and transnational interests to commit to targets for the achievement of the objectives outlined in several MEA
is also a serious blow against the maintenance of a collaborative structure of international environmental diplomacy. Nevertheless, there exists potential for international law to be an effective mechanism for effecting conservation in a transboundary region such as the southern Andes, and several agreements will be examined here. What the examples touched upon here have in common is the promotion of protected areas as an essential part of any conservation strategy.

For both Chile and Argentina, the Convention on Nature Protection and Wild Life Preservation in the Western Hemisphere (the Washington Convention) provided the legal and international impetus to formalize their protected area systems (Rogers and Moore 1995). The Washington Convention was one of the first treaties to protect wildlife by protecting habitats as well as the animals themselves, and is widely recognized as being a treaty ahead of its time (Rogers and Moore 1995). Though the treaty is half a century old now, it is still considered a legally relevant agreement whose mandate has been reinforced by the passage of other treaties such as the Convention on Biodiversity or the Ramsar agreement, both of which will be discussed below (Rogers and Moore 1995). The Washington Convention could help facilitate the regional implementation of the Convention on Biodiversity in particular, especially if revitalization of the convention includes designing process by which non-governmental organizations may participate more actively and designing funding mechanisms that assist countries in managing the financial challenges that come with in-situ biodiversity conservation (Rogers and Moore 1995). Such steps would be congruent with international environmental law that has emerged since the Washington Convention was signed, and these steps would be fully within the outline of participation in decision-making that is a key element of sustainability. The Washington Convention is a visionary treaty that has great potential if the right type of revitalization is given to the agreement (Rogers and Moore 1995).

The Convention on Wetlands of International Importance Especially as Waterfowl Habitat, or the Ramsar Convention, as it is known for the Iranian city in which the convention was adopted in 1971, is an important example of a more recent multilateral environmental agreement that addresses protected areas and
transboundary issues (Davis et al. 1996, MDSMA 2001). The United Nations Education Science and Culture Organization (UNESCO) is the trustee of the convention, but the offices and administration of the convention is managed by the International Union for the Conservation of Nature (IUCN), an organization that includes governments, conservation organizations, and private businesses (Davis et al. 1996). Both Chile and Argentina are signatories of the convention (Rogers and Moore 1995). The convention has language that specifically addresses the conservation of wetlands in a transboundary context, and the conservation of transboundary species, providing specific approaches that could be pursued by Chile and Argentina under the convention, including the establishment of “twin” sites (Davis et al. 1996). Part of the convention commits signatories to the establishment of “natural reserves” and the designation of sites to be protected specifically as Ramsar Sites (Davis et al. 1996, MDSMA 2001). Unfortunately such protection is often threatened by a lack of enforcement and flagrant violation of protected areas, the exploration for oil in a designated Ramsar site in San Sebastian Bay in Argentine Tierra del Fuego and the construction of a pulp plant just outside another Ramsar site in Valdivia, Chile being two clear examples (La Nacion 2001, Giusti 2001). Clearly the Ramsar Convention is another example of a well intentioned multilateral agreement that waits committed implementation by both specific nations and the international community, and that could as well provide important structure for the promotion of transboundary conservation in Southern South America.

Another relevant treaty negotiated at about the same time as the Ramsar agreement is the Convention Concerning the Protection of the World Cultural and Natural Heritage (the World Heritage Convention) that was adopted at the Stockholm Conference in 1972 (Lyster 1985). The far reaching language of the World Heritage Convention considers that the “deterioration or disappearance of any item of the cultural or natural heritage constitutes a harmful impoverishment of the heritage of all the nations of the world” and that “in view of the magnitude and the gravity of the new dangers threatening them, it is incumbent on the international community as a whole to participate in the protection of the cultural
and natural heritage” (Lyster 1985). The language of the World Heritage Convention concerning habitat protection has stricter obligations than does Ramsar (Lyster 1985). Though the World Heritage Convention has tactical applications that can be useful in protecting habitat from large development projects, the value of the Convention for the protection of wildlife will always be limited due to the focus on protecting only the world’s most select cultural and natural areas (Lyster 1985). The Convention provides a mechanism for giving international protection for some of the most outstanding natural habitats in the world while offering the prospect of financial and technical assistance to help countries protect these areas, being the only treaty that offers “developing countries” a material incentive to protect outstanding wildlife habitats (Lyster 1985). The greatest challenge surrounding the World Heritage Convention is actually succeeding in getting an area listed, as the committee meets only once a year, and it can be difficult to get governments to follow through on the process in order to get substantial international protection for landscapes that offer valuable natural resources (Lyster 1985).

Out of the 1992 United Nations Conference on Environment and Development in Rio de Janeiro came a far-reaching international environmental agreement known as the Convention on Biological Diversity (CBD). This convention is regarded as congruent with many other international agreements concerning the environment such as the Washington Convention and the Ramsar Convention, both discussed above (Rogers and Moore 1995). The CBD was ratified in Chile in 1994 (CEADA 2002). The terms of the CBD include expecting signatory nations to complete biodiversity surveys, and to improve government agency capacity for fulfilling conservation objectives (CEADA 2002).

A national consultation had taken place in 1997 that concluded that the Chilean government was failing to fulfill obligations as mandated in the CBD (RENACE 1997). In 2002 the Centro Austral de Derecho Ambiental (CEADA)—the Southern Environmental Law Center—published a report that is highly critical of the Chilean governments lack of commitment to the CBD.
(2002). The lack of contemporary forest management and wildlife conservation legislation is foremost amongst the failures of the government to implement the Rio agreements (CEADA 2002). As well, the lack of involvement of the multitude of diverse stakeholders, including indigenous and rural communities, is another sign of the failure of the government to implement the convention (CEADA 2002). Such detailed investigation is at the moment unavailable for the Argentine side of the temperate region of the Andes, but it is important to note Argentina is also a signatory of the CBD, and has ratified it (Dugo 2000). This convention, hailed as an important step in conserving the global commons, is yet another landmark environmental treaty that indicates the weakness of international law, as implementation continues to depend upon the willingness of parties to operate on “good faith.”

The Antarctic Treaty System could be considered an international treaty in which the participating bodies have tended to operate in good faith. An example of the collaborative intentions of this treaty system is the Protocol on the Protection of the Antarctic Environment, which was signed in Madrid in 1991 and rapidly ratified by both Chile and Argentina, though not entering into full effect until 1998. The purpose of the treaty was to protect the Antarctic continent, and the surrounding waters northwards up to 60 degrees south of the equator, from environmental degradation due to scientific research, tourism, resource exploitation, and mineral extraction (IAC 1996).

Significantly, for the temperate forests of Southern South America, the protocol attempts to monitor and reduce the environmental impacts of activities that could impact “dependent and associated ecosystems” both within and outside of the area designated by the protocol (IAC 2000, IAC 1996). Though there are differences of opinion as to what “dependent and associated ecosystems” might be, and the implications for advocating for the conservation of terrestrial sub-Antarctic forest landscapes, it has been agreed that the conceptual vision of the interdependence of Antarctic and South American continental ecosystems has merit, albeit on a spectrum of relevance for ecological purposes (IAC 2000). Because of the wide spectrum of opinion and lack of data regarding the concept of
"dependent and associated ecosystems," there are still arguments against including sub-Antarctic terrestrial ecosystems in the Protocol on the Protection of the Antarctic Environment (IAC 2000). The concept is still regarded largely as a political vision, and therefore lacking in ecological criteria that justify extending the zone of environmental protection established by the protocol (IAC 2000). It also reveals the data gaps in understanding the relationship between maritime and terrestrial ecosystems in the southern reaches of the Americas. Nevertheless, this angle for conservation advocacy is worth considering, as it does have its supporters in many nations in the southern hemisphere, and with more time and research data may show stronger arguments for considering environmental protections on the American continent as being an important part of protecting the Antarctic environment, and vice-versa (IAC 2000). This potential expansion of the Antarctic Protocol is a long-term legal strategy that will have weight in the arenas where these issues can be potentially discussed, such as the United Nations.

There are other developments in international environmental diplomacy during the last decade that reflect the importance of southern hemispherical collaboration in environmental planning and for advancing conservation of the southern temperate forests. In the months after the 1992 United Nations Conference on Environment and Development, and following a process carried out at various international forums such as the Antarctic Treaty System briefly described above, six southern hemispheric countries (Argentina, Australia, Chile, New Zealand, South Africa, and Uruguay) agreed to form a regional grouping for the purpose of sharing information and designing common courses of action relating to the global environment and scientific cooperation (Dodds 1998). This organization is called the Group of Temperate Southern Hemispheric Countries on Environment (the Valdivia Group, for the city in Chile in which the participating countries first met) and it was created to address common environmental strategies on issues such as biodiversity, climate change, forest conservation, and ozone depletion (Dodds 1998).
The organization finds itself struggling with a difficult balance of preserving national interests at the same time as they seek to promote collective action in dealing with hemispheric concerns such as ozone depletion, deforestation, and climatic change (Dodds 1998). This balance is reflected in the absence of wider questions such as resource depletion, industrial development, and debt in the ‘Valdivia debates,’ which seriously hampers the Valdivia Group in its ability to explore mutual environmental and political strategies (Dodds 1998). As a matter of fact, as of April 2002 no new meeting date had been set for the Valdivia Group (Videla 2002). The Valdivia Group is another example of an international agreement that could potentially make tremendous contributions to the advancement of regional and continental scale environmental planning, yet is dependent upon sincere participation on the part of all the different state players, as well as an expansion of the role of non-governmental stakeholders in the process (Dodds 1998).
The arena of international environmental diplomacy is in a precarious state. The idea of securing an “international treaty” establishing a Gondwana Forests Sanctuary is completely naïve considering the current situation. On the other hand, mechanisms for legal protections of nature, the advancement of reserve system design, and for regional and transboundary conservation planning exist. This chapter has outlined the legal and administrative framework for the region. The unwillingness of state and transnational players to commit to the objectives of the established agreements, coupled with an unequal distribution of international power and the reliance on parties participating in “good faith” create a difficult situation. These samples of international environmental law all provide tools for conservation. As such, these agreements could contribute to the establishment of sustainability, and assist in transboundary reserve system design. The question remains as to whether or not influential state and transnational players are willing to contribute to the resolution of crisis such as the loss of biodiversity, or if their policies are only meant to further the extension of the global race to the bottom and a bloody battle over scarce resources. Expanding the realm of politics, and extending reserve systems with buffering strategies in arenas far from crucial core habitat areas may be one way to advocate for sustainable conservation and societies. Global scale campaigning is highly effective when exercised with on the ground conservation work, as legal and political pressures can be negotiated into concrete steps in protection and practices. The labyrinth of social and economic context must be considered to successfully forward science-based conservation. These challenges will be addressed in the next chapter.
Chapter 5

Buffering Strategies: Responding to the Challenges of Sustainability

The social and economic context in which conservation strategies are implemented is of crucial importance. For instance, for protected-area managers, “detailed knowledge of the people whose lives are affected by the establishment and management of protected areas is as important as information about the plant and animal species to be conserved” (McNeely 1994). In the age of hemispheric and global integration, this knowledge includes pursuing an understanding of the larger transnational and global economic dynamics that drive current economies (Tisdell 1994). At the same time, looking at the complex matrix of local, national, and international distributions of land ownership, power, and wealth is a necessary part of analyzing social and economic context. As a word of advice to “pure scientists” who wish to work for conservation while keeping their hands clean of politics, it is considered that “conservationists should be able to play a key role in identifying political issues indirectly linked to species protection, such as economic imbalances” (Western et al. 1989). This wisdom can be shared in the other direction as well, through encouraging social justice advocates to understand that as a matter of fact, it is possible that “effective concern for the quality and health of global life support systems will serve as an agent for, and lend legitimacy to, societal reform” (Olembo 1989). This chapter examines the social and economic context in which conservation in southern South America is occurring, and proposes a commitment to a politics that prioritizes the conservation of biodiversity through the maintenance of the ecological integrity of protected areas by participating in buffering strategies that reach far beyond the geography of the protected areas and wild landscapes in concern, and that address national and trans-national players whose policies and projects directly impact the conservation of biodiversity.

It is widely recognized that the human communities near and within reserve systems and regional protected area networks must be considered in order to successfully achieve conservation goals (Soule 2001, Brandon et al. 1998,
McNeely 1994, Meffe and Carroll 1994). This consideration of human communities must examine larger scale motors of degradation that extend geographically beyond the territories directly adjacent to core habitat areas, and that have a national and international reach. This stance is a cornerstone to the methodology and arguments presented in this paper. Even profoundly "biocentric" conservationists have recognized that "the social sciences have taught conservationists that developing a sense of ownership among—and providing incentives to—the human neighbors of protected areas, if not sine qua non for success, are powerful conservation tools" and that "unless the vital needs of people living within and close to protected areas are considered, no amount of attention to the science of design and management will lead to a happy ending" (Soule 2001). This understanding of collaboration at a local level is more effective when the international motors of resource exploitation are considered as well (Tisdell 1994).

A specific challenge is to somehow connect the protected areas with the "outside world," thereby advancing an integration of the protected areas with the surrounding community, and the larger society that is influencing conservation success (Brandon et al. 1998). A role of the administrative and legal elements included in protected areas management has direct connotations for regulating and managing the integration of a reserve system with the surrounding human society, both local and "at large." This is made more complex by the recognition of the fact that protected areas are not currently sufficient on their own to meet conservation goals, and that a great deal of biodiversity conservation must occur on lands that are outside of stricter protected areas and upon which a variety of human activities are realized (Holdgate 1994, Noss and Cooperrider 1994, McNeely 1994, Western et al. 1989).

One of the most popular answers in the last 10 years has been the encouragement of the implementation of buffer zones close to and around protected areas (Groom et al. 1999, Brandon 1998). One of the key trends in this effort to link the "outside world" with protected areas has been the implementation of integrated conservation development projects (ICDP's), which
are based on the premise that linking conservation objectives to development activities will act as a long-term incentive for conservation (Brandon 1998).

The concept that economic development would be a necessary condition to facilitating human community participation in the stewardship of protected areas has been at the heart of many “sustainable development” projects (Soule 2001, Brandon 1998, Escobar 1995). As mentioned previously, sustainable development as it has been manifested popularly is perceived by many to have been a dangerous “new world deception” that “has done more harm to nature than good” (Soule 2001, Willers 1994). After the disappointing dynamics of the World Summit on Sustainable Development in Johannesburg in August of 2002, and the ongoing use of the term “sustainable development” in the promotion of anti-community and anti-environment industrial megaprojects in Southern Chile, this author would argue that the term is bankrupt and without meaning. Though “no compassionate person is opposed to the ideal of sustainable development” (Soule 2001) this chapter will argue that to truly participate in the creation of sustainability the misleading and co-opted terminology of sustainable development must be abandoned. The difficulty of the situation cannot be denied, as demonstrated by the tension existing between the potential achievement of a sustainable future and the immediate needs for strict biodiversity protections, encapsulated in the view that “there is no empirical justification for the theory that the achievement of sustainable and equitable economies at some time in the future can substitute for strict protection of biodiversity today” (Soule 2001).

As the last major section in this paper, this chapter aspires to examine a number of key concepts and ideas that are directly related to understanding the social and economic context of reserve system design in southern South America. By investigating this context, this chapter is the blending of natural and social sciences that are a key element of conservation biology and the Interdisciplinary Hypothesis as presented in the chapter on methodology. A superficial critique of the current economic and plantation forestry model driving habitat destruction in significant portions of the southern temperate forests is the first part of the chapter. This chapter will then take a look at the language and the objectives of
sustainability, concluding that instead of promoting sustainable development, alternative concepts such as the "development of sustainability" or "sustainable conservation" should be pursued and articulated. As well, several concrete examples of projects currently being realized in Chile will be briefly described in order to amplify the contemporary discussion of intentions to integrate human communities and conservation strategies.

The concept of buffer zones, those areas that "insulate the core areas and connecting corridors from deleterious influences" (Groom et al. 1999) is discussed, and thereby amplified. Buffer zones have important proven contributions to make to conservation, though there are also limits, weaknesses, and risks to such strategies (Groom et al. 1999). It is contended in this paper that the concept of buffer zones is entirely insufficient to protect a reserve system in the Southern Andes from human economic impacts without expanding the concept of buffers to include society and planet wide buffering strategies that address the influences of larger scale economic, natural resource, wealth, and power exploitation and distribution that present such grave threats to biodiversity conservation. With this expansion of the concept of buffer zones to entail wider buffering strategies will come a broadening of the political arena in which conservationists can realize efforts to maintain the ecological integrity of key core habitat, the areas of connectivity between them, and the landscapes of use which with every passing day retain more conservation relevancy.

Imperial Forestry and the Myth of the Trickledown Theory

In the year 2002, any discussion of forest politics and economic context in Chile or Argentina has to recognize the presence of a pervasive regional hegemonic national interest whose overriding power is often used to influence and even dictate economic, trade, environmental, and military policy (Silva 1997, Collins and Lear 1995). To address the social and economic context of conservation in the southern temperate forests of South America without discussing the policies and economic and military agenda of the United States of
America is to miss a key dynamic in how forest policy in the Americas is formed, shaped, and implemented (Silva 1997). The ongoing militarization of the region and hemisphere has profound social and economic implications that inhibit investment in conservation and distract human and financial resources from productive conservation uses. As an example, the recent sale of 10 F-16 fighter jets to the Chilean Air Force, at a minimum cost of US $600 million dollars, demonstrates how scarce state resources are being directed to the coffers of giant multi-national arms corporations, in this case Lockheed-Martin, as opposed to being invested in conservation and the development of sustainable economies and social systems. It had been estimated in the mid-1990’s that a fund of US $500 million dollars would have been sufficient to acquire all of the holdings necessary to assure the land base for the conservation of biodiversity in the forests of Chile until far in the future (Wilcox 1995). Another example of how militarization might impact conservation is the expressed interest of the United States to establish “anti-missile” bases in Argentine Patagonia as part of the missile defense shield “star wars” agenda of the United States military elite. To not address such larger dynamics of how regional hegemony influences policy at all levels within the nations of the Americas is to ignore one of the larger influences on how policy is developed and implemented (Silva 1997).

Even more incriminating, and as a prime example as to how forest policy is influenced by the regional imperial force, is a paper published in November 2001 by the United States Embassy in Santiago de Chile (GAIN 2001). In this paper, the US Embassy blames the “disruptive activities of ecologists” for the decrease in the rate of planting of exotic tree species, such as radiata pine or eucalyptus, and proposes that the future of the forestry sector in Chile lies in the conversion of the still extensive native forests of the south (GAIN 2001). The annual report bemoans the decrease in government subsidies for the exotic plantation model (GAIN 2001) even though those subsidies and the growth of the exotic tree species plantation forestry model are widely recognized as being prime factors in increasing environmental degradation and social problems for rural communities.

It is essential to recognize all of the different players that can influence the design of economic and policy models that can positively or negatively impact the natural environment and shape investment that will influence conservation efforts (Silva 1997). Alongside the regional hegemonic force, it is important to recognize the influence of trans-national economic players such as major extractive industry and financial sector private corporations (Silva 1997). On the international stage there is still little or no regulation or means of maintaining accountability over these multi-national corporations, although their influence in policy and development is undeniably tremendous (Sachs 2001, Silva 1997, Quiroga Martinez 1995, Escobar 1995, Collins and Lear 1995, Tisdell 1994). The current discussion to expand the North American Free Trade Agreement to an hemisphere wide Free Trade Area of the Americas does not include mechanisms by which multi-national corporations can be held responsible for their environmental, social, and financial crimes (Barlow 2001). As influential and untouchable as these trans-national forces are, along with major institutions such as the World Bank, the International Monetary Fund, the World Trade Organization, and the Inter-American Development Bank, there are still forces within society that can influence policy in an effective manner, including forest and environmental policy specifically, especially when the realities of the strength and agenda of the regional hegemonic power and the trans-national players are recognized and strategically addressed (Silva 1997). It is likely that the greatest mistake lies not in losing out to these powerful entities because of their strength and influence but rather in denying their influence and their exploitative goals in such a manner that conservation strategies do not take them sufficiently into account. Civil society, non-governmental organizations, unions, and different professional coalitions and associations can influence forest policy in a way that reflects positive goals, especially when all of the players are taken into account and their agenda anticipated (Silva 1997).
The current global economic model affects the lives of virtually everyone and every environment on the planet (Sachs 2001, Tisdell 1994). Hemispheric and global integration is accepted now not only as a characteristic of potential future economic models but as a defining quality of the global economic system that exists today. The ongoing question is not of whether to globalize or not, but as to who will benefit from these models and how an integrated hemispheric or global economic model will be structured (Sachs 2001). This question will be addressed further in this chapter, but first it is important to briefly describe the global economic system as it is now being implemented.

Some of the most important characterizations of the current global model are a dependence on capital-intensive technologies which rely on non-renewable resources such as fossil fuels, a dependence on chemical technologies, an increased international specialization in production by countries and regions, and enormous and increasing levels of production which tax the environment both in terms of the exploitation of raw natural resources and in terms of its ability to assimilate wastes and pollution (Tisdell 1994). International economic interdependence has encouraged the opening of markets for commodities and the exploitation of natural capital to meet balance of trade and debt payments, encouraging countries with a comparative advantage in supply of these commodities to exploit them more intensively (Sachs 2001, Escobar 1995, Tisdell 1994). There are some arguments that there are economic and conservation advantages to this model, especially in terms of the popular conception of "sustainable development" whereby increasing the income of a "less-developed country" will provide opportunities for conservation through the improvement of quality of life for its inhabitants (Escobar 1995, Collins and Lear 1995, Tisdell 1994). Nevertheless, these benefits for conservation are largely mythical, as "overall pressure on natural living resources has increased as a result of the extension of the global economic system" and "effective means of instituting large scale sustainable exploitation and agriculture are incompatible with capitalism and market globalization in their current manifestations" (Soule 2001, Tisdell 1994).
The trickle down theory, whereby increased imports lead to greater income for the larger economy and therefore precipitate a “trickling down” of the financial benefits to rural communities, marginalized populations, or even the middle class, is often used to justify the global economic system (Collins and Lear 1995, Quiroga Martinez 1995). Many advocates of the popular conception of “sustainable development” have contended that this “trickling down” will present a society with the economic improvement that will encourage conservation of natural resources and biodiversity (Escobar 1995, Willers 1994). In terms of the conservation of biodiversity, this is now largely considered a fallacy (Soule 2001, Escobar 1995, Willers 1994).

For many years now conservationists have noted that expansion of the market system can “result in a greater exploitation of natural resources, particularly through absentee investors (be they local or foreign), and thus lead to less conservation. Exploitation of resources through absentee owners can rapidly sever the link between humans and nature and induce a laissez-faire attitude toward a crisis in conservation” (Olembo 1989). Even more profound is the perspective that “the modern socio-economic system has become depersonalized and this has adverse consequences for nature and in some cases for the mental health of many individuals” (Tisdell 1994). Suffice it to say that the extinction crisis occurring on the planet today can be directly and negatively influenced by the ongoing expansion of a global economic system dominated by hegemonic state and corporate powers that continue to demonstrate no sincere interest in developing true economic and environmental sustainability (Sachs 2001, Soule 2001, Willers 1994, Hawken 1993).

A brief examination of the last 30 years of economic policy and industrial forest resource exploitation in Chile will assist in articulating the environmental and social degradation associated with the “neo-liberal” global economic model. This is but one example of how the global economy is negatively impacting the southern temperate forests. The time span of 30 years is important, because it was on September 11, 1973 that a military coup deposed the government of Salvador Allende, paving the way for broad economic and socio-political structural
adjustment in Chile. In the past three decades the growth of the forest sector in Chile, especially in terms of exports, and the concurrent degradation of the native forest, can be attributed to specific economic and resource management policies that were a result of the military government, which ruled for seventeen years between 1973 and 1990, and the continuation of export oriented policies since democracy was reestablished (Quiroga Martinez 1995, Collins and Lear 1995).

One of the most obvious characteristics of the forest sector policy which was implemented by the US supported Pinochet dictatorship was a rapid and extensive privatization of state holdings in land, production facilities, of businesses, and decision making processes (Carrere and Lohman 1996, Collins and Lear 1995, Quiroga Martinez 1995). The implementation of a subsidy program embodied in the Forestry Promotion Law of 1974 (DL 701) resulted in millions of dollars of annual subsidies to the largest forest sector interests, even as such subsidies ran against the grain of strict “neo-liberal” policy (Carrere and Lohman 1996, Collins and Lear 1995, Quiroga Martinez 1995). No other agricultural sector in Chile receives such regular and extensive subsidies (Collins and Lear 1995). In all actuality, the process of subsidies and privatization has managed to concentrate a majority of the Chilean forestry sector assets in the hands of a small number of the most powerful economic interests in the country, who were able to “pick up valuable assets for scandalously low sums” (Carrere and Lohman 1996, Collins and Lear 1995). These policies were prejudiced against small landowners, and many were forced to sell off their holdings, land which was further concentrated in the hands of the economic elite (Collins and Lear 1995, Quiroga Martinez 1995). Tax credits, which were established to favor forestry exports, allowed for products to be exported in any form, paving the way for massive raw log and wood chip exports while inhibiting the development of an added value forest products industry (Collins and Lear 1995). This export-oriented model dominates today, and as lax or non-existent regulation and environmental planning accompany it, it has lead to the destruction of a great portion of the most diverse region of native forests (Neira 2002, Quiroga Martinez 1995).
The Chilean forestry model repeats a classic third world pattern in the global economic system, whereby a majority of exports intensively exploit natural resources, often times non-renewable, and add little value or employment through manufacture (Sachs 2001, Carrere and Lohman 1996, Collins and Lear 1995). Increasing amounts of those exports are coming to the United States (GAIN 2001). Therefore it could be postulated that consumption in northern hemisphere nations such as the United States, combined with the implementation of draconian foreign policy and economic models, as evidenced in the US support of the installation and maintenance of the Pinochet dictatorship, has driven the destruction of Chile’s native forests, a global natural treasure. This is, however, a simplistic analysis; the causes of forest degradation are very complex. The point is that the most influential motors of environmental change in the southern temperate forests are coming from geographic sources that are often far from the buffer zone of a protected area. These distant roots of degradation must be addressed in order to effectively advocate for the conservation of biological diversity.

It is not the environment alone that has paid the price for Machiavellian militaristic, corporate and economic policies in Southern Chile. The social impacts of the plantation forestry model are recognized now to be devastating to rural communities. Contrary to the arguments of advocates of corporate globalization and the plantation forestry model, “the evidence shows that the forestry use of soil does not resolve problems of social development, poverty, and unemployment” (Unda et al. 1997). Even with a tremendous increase in exotic species plantations, and the increase in the percentage of the Chilean Gross Domestic Product attributed to the forestry sector, “there has been no equivalent growth in forestry employment” (Unda et al. 1997). Along with the dictatorship’s subsidization of the forestry sector came a flexibilizacion laboral, which is the equivalent of reducing the rights of laborers (Carrere and Lohman 1996, Collins and Lear 1995). Many forest workers are kept in a permanent state of classification as temporary workers, resulting in poor salaries and repugnant

Other social and economic impacts of the plantation forestry model are increased rural migration to the cities, a higher rate of poverty for those communities surrounded by the highest percentage of exotic tree species plantations, a degradation of rural infrastructure due to out-migration, and little local establishment of forest products businesses (Unda et al. 1997). The exposure of water, crops, cattle, and people to toxic chemicals used to control pests in the plantations also presents health risks for local communities (REMFO 2001, Unda et al. 1997). Changes in the water cycle due to the changes in soil composition and hydrology attributed to the exotic species plantations also has grave impacts on local communities (Unda et al. 1997, Carrere and Lohman 1996). It is estimated that these conditions could be seriously aggravated with a continuation of free trade commercial negotiations (Unda et al. 1997, Quiroga Martinez 1995). As well, there is every indication that major forest industry interests are planning major expansions into the remaining temperate rainforests of the southern Coastal Range (MacAlpin and Solis 2002). This expansion is accompanied by interest in technological advances such as genetically engineered eucalyptus species especially adapted to the colder temperatures of the south, and in a state subsidized road into the last remaining large tracts of intact native coastal rainforests (MacAlpin and Solis 2002, NFN 2001).

It is noted that the growth of the forestry sector in Chile since the installation of the Pinochet dictatorship in 1973 has been sizeable and important for the Chilean economy (Quiroga Martinez 1995). Nevertheless, the beneficiaries of this growth have been the largest forestry companies, whose interests are owned by the most powerful economic groups in the nation, or by trans-national corporations (Quiroga Martinez 1995). Small landowners or producers were left behind by this growth, and in many cases they had to leave the forestry sector altogether (Quiroga Martinez 1995). As well, when the macro-economic benefits are discussed, the environmental consequences and the loss suffered by natural capital have not been entered into the equation, an
externalization of economic costs that distorts the real costs and benefits of the export oriented exotic species tree plantation model (Quiroga Martinez 1995). This combination of laws that favor the exploitation of the forest while exercising an inaccurate assessment of the costs and benefits of the forestry model is creating a "vicious circle" whose economic and environmental impacts have yet to be coherently assessed (Giusti 2001, Quiroga Martinez 1995).

As the global economic system flexes military and financial muscle, whilst regional and global hegemonic interests abandon even the most rhetorical stances of "sustainable development," the need for implementing alternatives becomes more evident and pressing. One of the advantages of examining the globalized motors of the forestry sector in Chile is that it also reveals the popular concept of "sustainable development" to be falsely constructed on the premise that "peasants" or rural communities are to blame for the environmental impacts of their activities near and in protected areas, when it is highly likely that the global economic system is a primary culprit (Escobar 1995). Critiques of these false premises of sustainable development are the beginning of the next section of this chapter.

**Sustainable Conservation in an Age of Hemispheric and Global Integration**

The global economic model is based on the fundamental objective of continued growth, and with that growth comes an increased use of natural resources and capital (Escobar 1995, Tisdell 1994, Robinson 1993). At the same time, many development projects and "resource extraction schemes" are attempting to describe themselves as "sustainable development" (Soule 2001, Callicott 1997, Willers 1994, Robinson 1993). The inherent contradiction between continued economic growth and the maintenance of ecological health, sustainability, and integrity is at the root of the criticism of "sustainable development" (Sachs 2001, Soule 2001, Callicott 1997, Irvine 1995, Willers 1994, Robinson 1993). To some, the concept of "sustainable development" is not only erroneous; it is beyond repair (Irvine 1995). It has been contended, "the real
path to sustainability cannot be found by simply amending the program of sustainable development—it is too deeply buried in the human centered, expansion oriented worldview of industrial society” (Irvine 1995). It is this worldview of expansion that presents one of the greatest cultural threats to the conservation of biodiversity (Soule 2001, Irvine 1995). In considering the expansionist worldview contrasted with the task of reducing human consumption impacts, especially in the industrialized nations, it is possible that the ultimate criticism of “sustainable development” is that “far from preparing society for the mammoth task ahead, it is reinforcing the complacent view that we need to make only minor changes in the way we live” (Irvine 1995).

This critique of the term “sustainable development” has been articulated in order to demonstrate that evidence does suggest that, in terms of dealing effectively with the extinction crisis, which is the most serious social and environmental problem facing the planet today, the concept of “sustainable development” is largely bankrupt and without substance, and should therefore be perceived with profound skepticism. There have been many alternative concepts put forth, such as “sustainable conservation,” “ecological sustainability,” the “development of sustainability,” or the simple use of the term “sustainability,” all as a means of putting light on the importance of the ideals originally celebrated in the “sustainable development” paradigm (Soule 2001, Oelschlaeger and Rozzi 1998, Irvine 1997, Callicott 1997, Willers 1994, Robinson 1993). Sustainability may not be enough, though. Paul Hawken, a respected economist, has actually gone so far as to write, “sustainability is a non issue...we need to talk about restoration of our land, our people, our systems” (Hawken 1993).

While recognizing the relevance of the ecological reality that that statement reflects, the objective of sustainability is a concept that resounds well in the Latin American conservation community (Oelschlaeger and Rozzi 1998). Respecting that influence, the methodology of this paper contains a strict definition of sustainability, as described in Chapter 2, and believes that such a rigorous definition can assist in maintaining semantic and strategic relevance to the term “sustainable.” This rigorous definition is built around the six variables of
ecological integrity, economic sufficiency, appropriate technology, social justice, human dignity, and participatory decision-making; it is the dynamic interaction between these variables and the disciplines that accompany them that will define sustainability in practice (Oelshlaeger and Rozzi 1998).

Another concept that addresses the issue of proposing an alternative to the current global economic system and the now bankrupt rhetoric of sustainable development is the idea of “ecological economy” (Quiroga Martinez 1995). This interdisciplinary field of economics takes the relationship between ecosystems and economic systems seriously, and attempts to make human economics an open sub-system within a finite and closed ecosystem (Quiroga Martinez 1995). By addressing the inseparable relationship between economic processes and the consequential “transformation of nature,” economic ecology considers sustainability in terms of the “style of human development,” and not in terms of sustaining economic development and growth (Quiroga Martinez 1995). Such a study of economics reveals the inequalities existing in the global economic system between those nations and regions that absorb the wealth of nature and those that absorb the costs (Quiroga Martinez 1995). To address these inequalities is the task of the conservationist who is truly committed to buffering protected areas. As the motors of degradation grind on far from the natural areas in concern, affecting how people close to the reserve system use the landscape and resources in the area, a true buffering strategy will expand its geographical reference and diversify its strategic applications to locate a variety of effective locales for implementation.

The task, therefore, is to design an integrated approach to the harmonization of global and local environmental, social, and economic policy. Essentially, all human activities must be managed in light of their ecological impact (Irvine 1995). Invariably, though strict environmental protections are needed, especially for core habitat areas, this ecological approach to human activity demands a social and economic agenda (Berry 2001, Irvine, 1995, Frome 1995, Quiroga Martinez 1995). The task of sustainability will be as hard to accomplish as it sounds, and may even be an unrealistic objective, especially in the short term (Soule 2001,
Quiroga Martinez 1995, Robinson 1993). Nevertheless, it has to be attempted, and hopefully accomplished with some steady progress. Society has to be transformed in order to slow the extinction crisis, even though it appears that nothing short of a social and ecological revolution will achieve the changes necessary to maintain biodiversity on this planet (Soule 2001, Frome 1995).

This transformation can occur in a manner that addresses the immediate needs of conservation by adapting the concept of buffer zones to include region, nation, and planet wide buffering strategies. This entails working at a variety of scales, from the local to the global. On a local and regional scale, zoning is an important first step in designing buffers for a reserve system to meet the needs of conservation strategies (Soule and Terborgh 1999, Irvine 1995). For a buffer zone to have conservation value, the use of the land must be compatible with the region wide conservation goals—hence the use of the term “compatible use” (Groom et al. 1999, Dyer and Holland 1991).

The planning of buffer zones, even when founded in the best available ecological information, is a social exercise (Groom et al. 1999). Many different human activities may be occurring or proposed for potential buffer zones, and their degree of compatibility varies widely with the intensity and scope of the activity (Groom et al. 1999). Each scenario will require analysis as to how rigid and hard boundaries between protected areas and compatible use areas might have to be; in some places strict and hard divisions may be needed, while in others a more blurred and porous boundary will be appropriate (Redford 2000, Groom et al. 1999, O’Neal et al. 1995). It is important to mitigate alienating local people to the reserve system, a difficult chore, but one that is facilitated when the value of local people is recognized. The experience, heritage and knowledge of local people can be an asset in the long-term conservation of a reserve area (Redford 2000, O’Neal et al. 1995, McNeely 1994). Integrating local people into reserve system design and management is a challenging social, economic, and political issue, yet productive partnerships are possible when local people feel a sense of participation and ownership (Redford 2000, O’Neal et al. 1995, McNeely 1994). Buffer zones are very complex and dynamic units in a reserve system, with a
variety of conservation uses (Groom et al. 1999). The ecological success of the buffer relies on the success of strategies to minimize the cumulative impacts of human activities so as not to interrupt processes such as nutrient cycling, species reproduction, and interactions between species (Groom et al. 1999). There are dangers and weaknesses inherent in buffer zones, yet the opportunity for integrated conservation also exists, and cannot be underestimated (Groom et al. 1999).

Ultimately, the potential destructiveness of human kind can never be ignored when designing reserve systems, and it is for this reason that compatible use land zoning is meant to complement—but not to replace—protected core habitat areas (Redford 2000, Groom et al. 1999). Core habitat is the most important element in a reserve system and has to be prioritized (Noss et al. 1999, Noss and Cooperrider 1994). Nevertheless, the reserve system model needs a nested protected area management classification system that distinguishes zoning for compatible uses from those areas that are strictly protected.

The IUCN (International Union for the Conservation of Nature) has suggested a spectrum of categories for land zoning for protected and compatible use areas in an effort to integrate the diversity of human culture and the diversity of natural landscapes (Beresford and Phillips 2000). The application of protected area management in terms of the protected landscape approach has positive implications for buffer zones whether they are public or private, making this theory especially useful for the southern temperate forests. The IUCN protected area management categories are as follows (from Beresford and Phillips 2000, IUCN 1994):

- Category I: Area managed for Strict Protection (i.e. strict reserve/wilderness area).
- Category II: Area managed for Ecosystem Conservation and Recreation (i.e. national parks).
- Category III: Area managed for Conservation of Natural Features (i.e. natural monuments).
• Category IV: Area managed for Conservation through Active Management (i.e. habitat/species management area).

• Category V: Area managed for Landscape/Seascape Conservation and Recreation (i.e. protected landscape/seascape).

• Category VI: Area managed for Sustainable Use of Natural Ecosystems.

The protected landscape approach focuses on Categories V and VI, recognizing these zones as central to conservation strategies in that they can buffer and link protected areas, conserve both wild biodiversity and agrobiodiversity, support local economies, and reward the stewardship of natural and cultural resources (Beresford and Phillips 2000). There is a specific interest in promoting restoration in the protected landscape approach (Beresford and Phillips 2000), and this facilitates meeting rigorous objectives of sustainability. Note that there are several categories of increasingly strict management areas, providing a reliable structure for the protection of essential core habitats. Protected landscapes are lived in; they support human inhabitants, yet they must be subject to a planned conservation regime that includes a management plan that involves working with and through local people as a method of accomplishing conservation goals (Beresford and Phillips 2000). Protecting cultural heritage can improve the chances of protecting natural diversity as well, and any strategy for the protection of Andean landscapes will require tools adapted to the special cultural characteristics of the region (Brown and Mitchell 2000).

Incentives and consistent financial assistance can help include local people, and can help alleviate the degradation attributed to the global economic system (Soule 2001, Groom et al. 1999). Though most projects struggle for financing, and funding is unquestionably essential for conservation success, too much money pumped in to an ICDP or conservation effort has been recognized to have negative effects (Soule 2001). A balance must be found. Such an integrated approach fleshes out buffer zone design, creating still more opportunities for enhancing the conservation value of protected areas (Groom et al. 1999). For many threatened species in fragmented landscapes lacking large core areas, such
as parts of the Coastal Range of Chile, these buffer strategies may be their only hope (MacAlpin and Solis 2002, Groom et al. 1999).

There are examples of projects in Chile and Argentina that could easily fall into the category of buffer zone design, even if they do not describe themselves as such. These projects would be easily assimilated into a regional-scale protected landscape approach. The Fondo Bosque Templado (Temperate Forest Fund) is an effort of the World Wildlife Fund and the Chilean organization CODEFF to organize conservation oriented community development projects in a number of different locales throughout the Valdivian Rainforest Ecoregion (FBT 2001). The Fondo Bosque Templado has received funding from the Fund of the Americas program, whereby a certain percentage of the interest payments on foreign debt are directed back into community development and environmental protection projects. The Fund of the Americas program appears to be cutting back available funds as of this year. Another project that has direct relevance for buffer zones is the Proyecto Conservacion y Manejo Sustentable del Bosque Nativo (Native Forest Conservation and Sustainable Management Project), a cooperative effort between the German and Chilean governments to provide technical assistance to small landowners and rural communities in forest stand management (Palma 2002). The south of the Aysen Region of Chile is the region that the French government has begun cooperation with the Chilean government in the implementation of the Area de Conservacion de la Cultura y el Ambiente de la Patagonia—ACCA (Cultural and Environmental Conservation Area), a pilot project in conservation that attempts to integrate cultural and natural conservation on a regional scale (ACCA 2001). Many private conservation initiatives, as discussed in Chapter 4, also contain buffer zone strategies. All of these contemporary projects are of extreme relevance to any proposals for a transboundary reserve system because they reflect buffer zone strategies that are essential to reserve system design, and because current projects merit inclusion and support in any new proposals.

Tourism, and especially ecologically based tourism, have been noted as a particularly attractive and potentially effective local community and buffer zone
strategy (McLaren 1998, Whelan 1991). Tourism has seriously negative potential impacts if it is not managed or perceived clearly (McLaren 1998, Whelan 1991). Ecotourism is a term that is used casually and carelessly, and runs the risk of losing relevance, much as does the term “sustainable development” (McLaren 1998). Ecotourism does provide opportunities for conservation, though, especially as part of a bridge economy that assists in transitions from resource extraction to resource stewardship (McLaren 1998, Whelan 1991).

In its best form, ecological tourism “promotes environmental conservation, international understanding and cooperation, political and economic empowerment of local populations, and cultural preservation” (McLaren 1998). This is not always the case, though, and “ecotourism” has the potential to be “environmentally destructive, economically exploitative, culturally insensitive, ‘greenwashed’ travel” (McLaren 1998). In the southern temperate forests of Chile and Argentina, tourism is not viewed as a panacea, but its economic importance is taken into serious consideration when compared with resource extraction (Langman 1998). Certain tourism projects, such as a transboundary binational indigenous tourism network, or the specific concessions of state land in Chile’s Aysen province dedicated to huemul conservation tourism, demonstrate the growing appeal of using tourism in the Southern Andes to promote natural and cultural conservation. Ecotourism has tremendous potential, yet it has to be approached with the appropriate dose of skepticism and sufficiently high standards in order to realize conservation objectives (Groom et al. 1999, McLaren 1998, Whelan 1991).

Broadening the Political Arena

The successful implementation of buffer zones is one of the most delicate tasks in reserve system design (Groom et al. 1999). Arriving at a regional consensus concerning the possibilities of a protected landscape approach could assist in assuring congruency of public and private conservation efforts. Having such concepts in common in even an informal sense through communication
between regional conservation players would increase conservation success. Though financial and human resources are scarce, an important complimentary tactic to conservation projects in the buffer zones are the buffering strategies that are meant to address the consumption and exploitation that are characteristic of the global economic system. To reach out and discover political colleagues in conservation requires the reevaluation of institutional boundaries and the professional awards system (Vitousek 1994). One of the greatest challenges to the creation of an interdisciplinary conservation politics that directly addresses the global motors of environmental degradation is getting conservationists and natural scientists to grasp the necessity of political participation in order to realize positive social change in the face of the threats of corporate globalization. As noted chemical ecologist Tom Eisner relates, "we know how many acres of natural habitat are disappearing, and in what parts of the world. It’s that reality that needs to be faced. I get somewhat impatient with conservation biologists who, overly conscious of their role as scientists, always come up with recommendations for further study rather than action. We know what is happening, so let’s find the political way to stem the tide” (Seidl 2000).

An important part of the politics of conservation involves securing the funding necessary to realize conservation planning and projects (McNeely 1994, Tisdell 1994, Barzetti 1993). The politics of financing conservation have taken a turn for the worse with the outcomes of the Johannesburg Summit in August 2002. One of the key funding mechanisms for conservation coming out of the Earth Summit in Rio was the creation of the Global Environmental Facility (McNeely 1994, Tisdell 1994). This fund, managed by the World Bank, grew steadily through the 1990’s, only to be “de-prioritized” at the Johannesburg Summit (Macan-Markar 2002). This type of funding for major conservation projects has been superseded by a new “partnership” schematic, whereby private, especially corporate funding sources will be relied upon to support conservation as part of the development of industrial and economic projects (Macan-Markar 2002). These partnerships are considered to be in opposition to the spirit of international cooperation that is necessary to realize the original goals of the
Conventional on Biodiversity and the concepts of “sustainable development” (Macan-Markar 2002). Such current dynamics reveal once again the sources of degradation inherent in the current global economic system, and the resistance of the global political and corporate elite to address pressing social, economic, and environmental issues in an egalitarian and integrated fashion. It is in this social and economic context that buffer zones, as important as they are, are completely insufficient for maintaining the integrity of protected areas without wider buffering strategies that address the structural economic and power inequalities that are ultimately driving the extinction crisis.

### TABLE FIVE: Meeting the Challenges of Sustainability

**Protected Landscape Approach:** A spectrum of protected area guidelines, focusing on cores, corridors, and buffer zones, that outlines management from strict protection areas to the design of buffer zone areas for appropriate human economies through the limited use of natural resources by methods such as sustainable forestry practices, traditional knowledge based non-timber forest product harvesting, and eco-tourism, amongst other strategies.

**Buffering Strategies:** Meant to compliment the protected landscape approach by addressing geographically distant roots of degradation and the threat of mega-development projects through corporate focused campaigns, foreign policy campaigns, and outreach and education emphasizing the global motors of environmental damage.

Such strategies will demand interdisciplinary approaches and the broadening of the political arena to include campaigns and strategies that focus on consumption, commodity markets, foreign policy, regulating transnational players such as corporations, and a reexamining of the global economic system. Reserve system design and the implementation of buffer zones include the incentives of “social pressures to cooperate with plans that promote public use areas and protect natural areas from development and exploitation” (Groom et al. 1999). Though “corporate” campaigns are correctly perceived as an important part of how groups in the United States can support Chileans and Argentineans in promoting the
Gondwana Forest Sanctuary, the purpose and context of the campaigns has never been articulated in this practical form. Creating regional, national, and global *buffering strategies* that address conservation is a key element of the incentive system that can make buffer zones, and a regional scale reserve system, work effectively. We know what is happening to the planet. The challenge of sustainability is to deal with the crisis in an integrated and courageous fashion by addressing the gamut of hierarchies within which conservation must occur. Questions remain as to whether professional conservationists, especially in the northern hemisphere, have the courage and the insight to create the political motion to participate in the social change that global biodiversity conservation will entail.
Section IV. Closing

Chapter 6

The Gondwana Proposal

This paper has drawn upon a myriad of sources to substantiate the stance that interdisciplinary approaches are needed to respond to the global environmental crisis as it is being manifested in the southern temperate forests of Chile and Argentina. In order to analyze the prospects of reserve system design and transboundary conservation strategies, a variety of fields have been explored, simplified into the three arenas of scientific considerations, the legal-administrative framework, and the social and economic context. It has been demonstrated that there is an excellent body of literature that supports this approach, much of it coming from Chile and Argentina. A purpose of this academic exercise has been to critically examine the naïve language around “sustainable development” and “reserve system” as used in the first visionary meetings considering the Gondwana Forests Sanctuary. As this paper has presented the necessary information, these terms have been critically approached and discussed, providing a stronger conceptual foundation for the pursuit of a transboundary conservation planning strategy and network.

The use of the term network is not by accident. This paper has been composed in an office on the north side of the railroad tracks in Missoula, Montana. Many of the ideas for the Southern Andes reserve system concept discussed in this paper have been previously applied and investigated in terms of the Yellowstone to Yukon Conservation Initiative—Y2Y (Wilcox et al. 1998). The Y2Y project was already under way as the first Gondwana meeting occurred, and it was discussed as an attractive potential model for the integration of conservation efforts in the southern temperate forests. The goals of creating effective international political alliances and creating sustainable alternatives to

95
resist the degradation of the current global economic system may not be specific objectives of Y2Y. However, these ideas were explicitly included in the forming of the Gondwana vision. Reserve system design as investigated in this paper is not imposing a northern model on a southern situation; rather this work is contributing to a discussion as to how best harvest a diversity of ideas and strategies in order to advance regional conservation in an age of hemispheric and global integration.

A transboundary advocacy network is defined as: an “alternative channel of communication” at the center of which is the “production, exchange, and strategic use of information” (Chester 1999). Information is the essence of a network (Chester 1999). This paper is a contribution to the different organizations, from a variety of nations, all of which are interested in the conservation of the southern temperate forests. As such, this project has been carried out as part of a transboundary advocacy network in hopes of facilitating and improving grassroots advocacy for the sustainable conservation of the southern temperate forests.

The existence of the Gondwana network has been a crucial element of ongoing conservation and sustainability advocacy for the temperate forests of Chile and Argentina. Though technical and more advanced concepts of reserve system design are discussed in this initial Gondwana Proposal, the maintenance of the international transboundary advocacy network that has supported the Gondwana concept in broader scale buffering strategies is of the most immediate concern. The international support of organizations in North America, Australia, and New Zealand has been essential, particularly in corporate focused campaigns instigated to halt exploitative industrial mega-projects. Nevertheless, at this very moment, the most critical element of the transboundary advocacy network that needs support is the maintenance and expansion of communication and collaborative strategizing between the Argentinean and Chilean organizations involved with the Gondwana Proposal. There are cultural, financial, and geographical challenges to expanding this network, but they must be overcome if effective advocacy for regional-scale conservation planning is to occur.
Non-governmental organizations and civil society are an important structural element of the grassroots ability to influence policy (Bebbington 1998, Silva 1997). It is possible, with effective organizing and strategizing, for the grassroots to positively influence the more powerful players in the global economic system in order to realize goals of sustainability and conservation (Bebbington 1998, Silva 1997). The processes of public participation are one of the key elements of creating sustainability (Oelschlaeger and Rozzi 1998). In these critical political and economic times, it is imperative to maintain and expand what has proven to be an effective network of organizations and individuals concerned with southern temperate forest conservation. The seeds of Gondwana have been planted throughout Patagonia, and they are closer to being ready for rapid growth.

From the information discussed in this paper there are conclusions that serve as important suggestions to improve the articulation and realization of the Gondwana reserve system proposal. In summary, these suggestions are as follows:

- The maintenance and expansion of a transboundary advocacy network, with an emphasis on Chilean and Argentinean participants.
- A continued prioritization of protecting habitat through private conservation initiatives, especially by land acquisition.
- The integration of a protected landscape approach to the issues of buffer zones and compatible use areas, in order to rapidly advance the inclusion of the social disciplines that must be involved with the Gondwana vision in order to guarantee success, and to amplify the application of private conservation initiatives.
- Further investigation of the potential application and implementation of a focal species strategy as an ecological base to reserve system design. The huemul is suggested as a flagship species extraordinaire, whose protection should be immediately prioritized in the Gondwana Proposal.
• A continued dedication in the northern hemisphere to corporate, foreign policy, trade policy, and market campaigns. These campaigns are now understood to fit into regional scale conservation planning as crucial buffering strategies that assist in mitigating the degrading impacts of the global economic system on the southern temperate forests of South America.

• The practical and active pursuit of national and international law, with a particular focus on the potential of the Chilean-Argentinean Binational Treaty on Environmental Protection, which could provide particularly good angles to promote forest conservation through the protection of endangered species and the development of transboundary focal species strategies.

• A complete understanding of the current impracticality of securing an “international treaty” establishing the Gondwana Forests Sanctuary will be an important step in clearer messaging and functional strategizing. Long-term hopes for such an agreement are likely to be based on Antarctica’s Environmental Protection Protocol.

• More effective use of conservation Geographical Information Systems is needed, concentrating on regional scale mapping. This is an aspect of the original Gondwana Forests Sanctuary vision that has failed to meet its objectives, yet is still of tremendous importance, especially in approaching funding sources and for business proposals.

The Gondwana Proposal is an interdisciplinary analysis of the variables surrounding conservation in the Southern Andes. This paper will hopefully be the first in a growing discussion of the technical aspects of designing an effective transboundary conservation plan in the temperate south. It is not an exhaustive study, nor is it the last word in transboundary conservation in the Southern Andes. To continue building momentum, though, demands the maintenance and the expansion of the network of people and organizations dedicated to the themes addressed in this paper. Without such momentum and networking, this paper is but one more esoteric intellectual exercise. Nevertheless, it has been written, “the long-term presence of a scientist/activist can make a profound difference in a
region” (Soule and Terborgh 1999). There is such profound commitment to place amongst the Gondwanista community that there will always be efforts to advocate for conservation in the face of the global doomsday economy.

*El bosque llama—lo escuchas?*
REFERENCES CITED

ACCA. 2001. Plan de Manejo del Area de Conservacion de la Cultura y el Ambiente (ACCA) de la Patagonia: Una guia para el Desarrollo Sustentable de la Provincias de General Carrera y Capitan Prat, XI Region de Aysen, Chile. CONAMA: Coihaique, Chile.


CEADA. 2002. *An analysis of Chile’s implementation of the Convention on Biological Diversity with a focus on forests: An independent review and recommendations for action.* Centro Austral de Derecho Ambiental, Fredes and Bostelman, eds. Santiago de Chile.


Palma, W. 2002. Interview with Sr. Wildo Palma, Forest Technician of Proyecto Conservacion y Manejo Sustentable del Bosque Nativo, Coihaique, Aisen Region, Chile.


Videla, R. 2002. Interview with Sr. Ricardo Videla, who is in charge of bi-national cooperation in the Direction of the Environment of the Chilean Ministry of Foreign Relations, on 19 April, in Santiago de Chile. Interview included examining a copy of the bilateral Treaty between Chile and Argentina over the Protection of the Environment.


