

Wildlands and Biodiversity of South America



Project Summary and Highlights

Wildlands are places where ecosystems are still characterized by natural processes and where native biodiversity finds its fullest expression. Wildlands are defined as areas without roads and containing only very minimal human development. The wildlands of South America present one of the most important reservoirs of biodiversity on the Earth. We have begun a program of systematic mapping of wildlands and an assessment of their contribution to regional and global biodiversity. A primary goal of the project is to identify and characterize wildland areas that are vulnerable to fragmentation, development and biodiversity loss due to changes in climate, economy, energy, population and globalization. Our goal is to provide a rich source of information on wildlands and related biodiversity that can inform conservation initiatives at local, national and global scales. This will be accomplished through close collaboration with partners at local, national and global levels and through tapping into a reservoir of enthusiastic and skilled volunteers.

- The timing is ripe for this project. South America still has immense wildland and biodiversity resources that are unparalleled in today's world – but the wildlands that harbor much of this biodiversity are disappearing rapidly due to human development and resource extraction.
- It will provide baseline data on wildlands and related biodiversity in South America. Much of the information that will be developed in this project does not now exist.

- The project is intended to provide valuable information that informs conservation decisions and increases capability of conservation scientists and conservation NGOs in South America.
- It will stimulate decision-making on conservation issues based on scientific information and well-defined, ecologically meaningful conservation units (wildland areas). A biodiversity-focused decision support system will provide a tool conservationist can use to evaluate biodiversity values and integrate them in local, regional and national conservation decisions.
- The project will identify conservation linkages between neighboring countries, thus offering unique opportunities for collaborative conservation work that transcends beyond national boundaries.
- It will help build the capacity of partner NGOs through training and material support.
- It will integrate the involvement of volunteers, located both in the USA and in South America, to conduct some of the wildland assessment tasks, using Google Earth, spatial information accessed through ESRI software and on-the-ground assessments.
- It will integrate and develop baseline data on the effects of conservation and various forms of development and resource extraction on indigenous peoples.

This project focuses first on mapping and analyzing the roadless and undeveloped areas of Chile and Argentina using a procedure Pacific Biodiversity Institute (PBI) developed to map the wildlands of the USA. In 2001, we conducted a similar project assessing the wildlands of the USA, covering an area nearly 3 times as large as the area we intend to map in the initial phase of this project. Since 2001, there have been vast improvements in GIS and computer technology that will greatly facilitate this work. An important part of the project involves visual assessment of wildland areas through aerial photo and satellite image interpretation. In our previous work of this nature, this has been a very difficult task, requiring development of a vast library of remotely-sensed imagery for each study area. Today, that has been accomplished by our friends at Google Earth who have assembled this information for the entire planet. We will train volunteers in visual assessment and data capture techniques using Google Earth. They can digitize new roads, developments and other features using Google Earth. This ability allows many people to assist with the project using fairly simple computers and with only a few days of training.

We have already done some initial mapping in Chile and Argentina and identified one wildland complex that is over 13 million acres, over twice the size of the largest wildland complex in the continental USA (the wilderness portion of the Yellowstone Ecosystem). We have identified many other wildland complexes in Chile and Argentina that exceed 5 million acres.

After we map the wildland areas, we will analyze a suite of landscape attributes that are indicators of biodiversity and conservation value. These attributes will be used to determine initial conservation priorities within the wildlands of Chile and Argentina. The products will be a series of valuable spatial datasets, a multi-lingual conservation decision support system to determine conservation priorities, a highly readable multi-lingual report, and a multi-lingual website to help disseminate the project results.

This project will provide a base for international collaboration between international, national and local conservation interests. Our past work in mapping and analysis of

wildlands in the USA has been useful in stimulating and supporting conservation of some of the most important wild places in this country. The current project will do the same, first in Chile and Argentina, then later throughout the rest of South America. The project incorporates educational components critical to ensuring that the results are widely distributed to key decision-makers and to the general public. This is a multi-year project, with significant results expected in the first two years.

Work Plan and Timeline

The basic methods we will employ in this project are innovative GIS analysis techniques pioneered by PBI and first applied in Washington State, then eventually across the rest of the United States. The techniques are both innovative and proven. We have already applied the basic methods across most of the North American landscape and produced results and products that are of great help to wildland conservation efforts.

This project has a multi-year timeline. It will be conducted in phases, with the first phase focusing on Chile and Argentina, the southern cone of the continent. Many of the tasks will be undertaken by our partners in the corresponding countries, with assistance, technology-transfer and training from PBI.

The basic project steps are as follows:

- Year 1
 - Collaborative decision-making with partners about fundamental analysis parameters, scope of the biodiversity analysis, data layers to use, etc.
 - Acquisition of existing data by partners and PBI along with the development of data sharing agreements.
 - Initial training and technology-transfers between partners. Initial training of volunteers in both USA and South America.
 - Initial analysis of data and determination of extent of data gaps.
 - Collaborative discussions and decision-making with partners about handling/filling of data gaps.
 - Filling of necessary data gaps with data derived from remote sensing or other secondary sources.
 - Assembly of data layers for the transportation system and for development infrastructure.
 - Implementation of a spatial analysis process to determine boundaries of wildlands that meet the project parameters (described above) using automated GIS algorithms similar to those developed by PBI in previous work.
 - Creation of initial wildland polygons using the data and process described above and conversion of these to Google Earth compatible KMZ files.
 - The trained volunteer base will review all wildland polygons for roads and other development impacts using Google Earth and assemble datasets of revisions to be made in the initial wildland polygons.
 - These revisions will be incorporated into the initial datasets and a new wildland polygon dataset will be developed using the methods described above.
 - Collection and assembly of a suite of landscape-level factors for the project area to use in predicting biodiversity and conservation values. These may include: distribution of major biomes and ecosystems, existing vegetation and land use, topography, distribution and abundance of imperiled species, distribution of other important species, human population density, night sky luminance (an indicator of overall human influence), existing protected area

- status, land ownership, status of indigenous peoples in the wildland area and vicinity, and other factors.
- Overlay and analysis of the above factors to determine the internal attributes of each wildland area.
 - Analysis of the landscape surrounding each wildland area to determine the landscape context of the area and opportunities for connectivity. Some wildland areas are surrounded by other wildlands; others are surrounded by agricultural areas, while others may have urban areas on some of their borders. The landscape context may have considerable influence of conservation issues and opportunities within each area. The landscape context also determines opportunities for connectivity between areas. We will attribute each wildland area with its landscape context information.
 - Creation of a multi-lingual decision support system that can be used to access the information about wildlands and conduct assessments of conservation priorities.
- Year 2
 - Further refinement of the wildland mapping in Chile and Argentina.
 - Conduct on-the-ground surveys of many high priority wildland areas.
 - Creation of Internet-based access to information about wildland locations and characteristics. We will initially use a Google Map interface, similar to that we have developed to disseminate other web maps on our current website.
 - A series of workshops at key locations will be organized to present the information and the wildland biodiversity decision support system. We will conduct multi-day trainings that cover the contents and use of the decision support system.
 - Other public educational components will be developed with our project partners to maximize the impact of this project. Some of these educational efforts will focus on key decision-makers in the public and private sectors. Other education efforts may focus on influencing the general public to support conservation of wildlands through the print and broadcast media and the Internet.
 - Year 3
 - We will begin incorporating other countries to the north, starting with Bolivia, Paraguay and Uruguay. By the end of the third year we hope to have incorporated the 5 southern countries on the continent.
 - We will work with project partners to initiate a program to monitor trends in wildlands with respect to conservation and development. The eventual goal will be to create a network of conservation organizations that can keep the data current and use it for long-term trend monitoring and conservation decisions.
 - Years 4 and 5
 - In Years 4 and 5, we will incorporate the northern part of the South American continent and complete the mapping phase of the project.
 - Further development of the wildland monitoring program and further work in disseminating information that has been developed by this project.

Project Components

This project has three components: research, technical support, and public education. All three dimensions are directly tied to PBI's mission statement. The research dimension touches on the fields of landscape ecology, conservation biology and natural resource

management. The primary research goal of the project is to investigate and gain a better understanding of the location, spatial pattern and internal characteristics of wildlands on the South American continent and their relationship with biodiversity resources. An objective of our research is to gain a better understanding of the role wildlands play in the conservation of biodiversity and the maintenance of ecological integrity on local, national and global scales. Our goal is to also gain a better understanding of the interaction between various land management practices and wildlands in South America.

The second dimension of this project is to provide technical support for our NGO partners in South America. This will give our partners the capability to do much of the intensive work on this project. Our intention is that this project will help build the capacity of the conservation partners and that they will reap the primary rewards of the project.

The third dimension of this project is to work with our NGO partners to produce maps, reports and presentations that can be used to educate the conservation community and other decision-makers in the public and private sector about the role that wildlands play in the conservation of biodiversity and the maintenance of ecological integrity. The educational component of this project will also include dissemination of information and training in the application of science-based prioritization methods to wildland conservation.

Project Goals

- The goal of the project is to identify areas vulnerable to biodiversity loss related to changes in climate, economy, energy, population and globalization. Wildlands have historically been highly vulnerable to the forces of population growth, economic exploitation, globalization, and energy extraction. They are also great reservoirs of biodiversity.
- The project involves technology transfer and education relating to biodiversity values, building off the work we have done in the past with Parques Para Chile. We will partner with other conservation NGOs in biodiversity-rich countries like Chile and Argentina that could use our assistance.
- The project establishes a baseline for long-term (and short-term) monitoring of ecological and biodiversity trends related to five important drivers (climate change, peak oil, dramatic shifts in the economy and finance, globalization and population increase) that PBI has previously identified. It allows for the initiation of monitoring of wildland status and biodiversity values in South America.
- One of the products of the study will be a conservation prioritization of wildlands in each country via a dynamic decision support system that directly accounts for the key drivers discussed above. This will allow our partners and other interested parties to assess wildland area conservation priorities from a variety of viewpoints.
- The educational component of the study relates to one of PBI's important strategic directions: "Connecting biodiversity to human values, making the case about why biodiversity is important." PBI, together with our conservation partners, will engage in a variety of educational opportunities that will further the understanding of the role that biologically diverse wildlands play in maintaining an exciting, productive and rewarding world for humans to live in.

Conservation Significance and Need

This project addresses a high priority biodiversity conservation need. While there is consensus within the scientific community that wildlands play an essential role in the conservation of biodiversity, there is a current dearth of information about the location, spatial context and internal characteristics of wildlands in South America. It is well recognized that the South American continent contains some of the most important biodiversity hotspots on the planet. Development and dissemination of better information on the characteristics of wildlands in South America can play a key role in the future of global biodiversity conservation. That is a primary goal of this project.

This project has an impact on local, regional, national and global scales. Ultimately, the project will provide a continent-wide assessment of wildlands of conservation significance. The South American continent is of key global biodiversity importance. In addition to overview information at a continental and national scale, this project will also provide highly accurate and spatially explicit information for conservation planning and protection efforts at the scale of local watersheds or mountain ranges.

The project has a sound scientific basis and approach. Through the work of our partner organizations, the project will also address social, political and economic dimensions of the wildland issue. While our initial goals are to develop a rich repository of information about wildlands and related biodiversity, we also hope to stimulate public interest in these areas. Careful consideration of the social, political and economic dimensions of wildland conservation and management is essential for this work to have long-term value and contribute to meaningful conservation actions. Our local and national partners will play a key role in the social, political and economic aspects of the project.

The project furthers conservation science in a number of ways. It develops a baseline of information on the location, spatial configuration, spatial context and internal characteristics of wildlands in South America. It will explore the interaction between wildland areas, their biophysical characteristics, human uses and a variety of indicators of biodiversity. It provides a jumping off point for a wide variety of studies in the field of landscape ecology that explore biodiversity conservation as it relates to the spatial configuration of wild, rural and urban landscapes at a continental scale.



A Google Earth image of part of an immense wildland complex in northern Argentina and Chile, extending into Bolivia and crossing both sides of the Andes (in the distance). This wildland complex contains subtropical jungles, montane forests, deserts, alpine areas, extensive wetlands, untamed rivers, and more. It is very seldom visited and largely unknown except to a few multinational mining companies.

Impact

The effect that this project can have on a global scale is:

- It will draw international attention to some of the enormous and highly biodiverse wild areas of South America, not just in well publicized places like the Amazon, but also in little known places. For example, in our preliminary analysis it is apparent that some of the largest wildland complexes on the planet exist in little known locations in Argentina (often extending into adjacent countries). The Rio Parana wetland wilderness complex extends across nearly 4.5 million hectares (over 11 million acres) in Argentina and extends into significantly more wild terrain in Paraguay. In comparison, the largest wildland complex in the continental USA (the Yellowstone Ecosystem) is less than 2.8 million hectares. There are numerous, huge, and high biodiversity wildland complexes remaining in South America. However, these are quickly becoming fragmented and degraded through persistent pressures for development and resource extraction. Unless more work is done to delineate and describe the wildland areas, determine their conservation significance and draw attention to them, many of these wildland complexes will disappear before they gain national and international prominence.
- It will produce a baseline from which trends in wildlands of South America can be gauged. As stated above, many of these wildland complexes are rapidly

becoming fragmented, but we do not know how fast and which areas are at highest risk of disappearing.

- It will provide an important information base for conservation planning in South America that currently does not exist.
- It will provide information to the current growing interest in the effects of both conservation and development on the indigenous people who use these areas

The effect of the project at national to local scales

- On national, regional and local scales this project will provide detailed data that can be used for conservation planning and prioritization that is meaningful at watershed or mountain range scales, as well as at national scales.
- The information developed by this project can form the initial basis for conservation proposals designed to protect individual areas as parks or other kinds of protected areas. This may happen at local, regional or national scales.
- The educational components of this project would be applied at national and regional scales, enhancing public awareness of wildland areas and stimulating appreciation of the values that wildlands offer within the realm of influential decision-makers.

Practicality

We can do it! Pacific Biodiversity Institute has already accomplished a project of a very similar nature. In 2001, we mapped and analyzed the wildlands of the USA (9449365 km²). Chile and Argentina are only 37% (3525347 km²) of the size of this previous project. Inclusion of Bolivia, Paraguay and Uruguay in the analysis area makes it only 55% the size of the USA (5193311 km²). The entire South American continent is 187% the size of the USA. We completed the USA wildlands inventory in less than a year. There have been very significant improvements in computer processing technology and GIS software since we did the USA project. Technology was a significant limitation in 2001, but much of this limitation has now been removed. Our staff is even more capable at GIS analysis and experienced in GIS training than we were in 2001. These factors will ensure we can get this project accomplished in a timely fashion. We can accomplish the first phase in less than two years and move rapidly on to finish the rest of the continent in about three years. The project does have educational and outreach dimensions that were not included in our USA wildlands mapping – and this does add additional complexity, value and time to the project. However, this project can be accomplished and still allow PBI to conduct other projects in the USA on the local and regional scales.

Conducting this work in Latin America poses difficulties that we did not encounter when we did similar work in the USA. The spatial databases that are needed for accurate mapping and determination of attributes of wildland areas are not as well developed as they are in the USA. As a result, we will need to do more original data development and will be dependent on tremendous cooperation and data sharing of partner organizations in various countries. While we acknowledge these potential difficulties, we also feel that the products of this project will provide better information (probably be at least an order of magnitude) that what currently exists.

Partnerships

We are actively seeking conservation partners for this project. We are working to form a partnership with at least one national conservation group in each country as well as with regional and local groups that have an interest in the conservation of biodiversity

and wildlands. We are also working to form partnerships with international conservation organizations which have an interest in the biodiversity and wildlands of South America. In addition to this, we are interested in forming partnerships with scientists and students at universities in South American countries that may be interested in participating in this project.

Our intention is that the local, regional and national conservation NGOs that partner with us in this project will reap the primary rewards of the project. The partner organizations will benefit from a transfer of expertise and technology from PBI. Since we have already engaged in a similar project that covers the entire USA and its territories, we have a lot of experience and expertise to offer others. PBI can help the various partner organizations pull together a continent-wide coalition to achieve the eventual goal of a seamless, continental-scale analysis of wildlands and related biodiversity values. PBI can also help the partner organizations with international fundraising activities that will be needed to make this project a success.

PBI will benefit from the partnerships in many ways, but the primary purpose of this project is not to acquire benefits to our organization. The primary purpose is to benefit the partner organizations and biodiversity conservation at multiple scales. If NGO's in each of the South American countries learn how to develop and use this kind of information for a continental overview it will have a major impact on conservation initiatives in the whole of South America.

The project is organized so that there will be joint decision-making and ample opportunities for meetings, communications and coordination needed to make the project a success. The project is of sufficient scope to require close collaboration and a collective effort, as it is beyond the expertise and resources of any one partner organization (including PBI). More details of how partner organizations will work together is provided in the project work plan.

The following list contains potential partners in various countries that will be considered for inclusion in the project during the first two years. We have had initial contact with a few of these partners, while others have yet to be contacted.

Potential international partners include: ESRI, Google, National Geographic Society, The Nature Conservancy (TNC), WWF-World Wide Fund for Nature, Rainforest Concern, Wildlife Conservation Society, Conservation International, and Birdlife International, International Union for the Conservation of Nature, World Conservation Monitoring Center, Natural Resources Defense Council.

Potential partners in Chile:

- **Parques Para Chile**
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Correo: Carlos Andwandter N° 525 · Valdivia · Chile
Fono: 56-63-24 87 31
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- **The Nature Conservancy (TNC) – Chile**

Contacts: Mercedes Ibanez Leon, Stephan Halloy
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Correo: Marchant Pereira 367, Oficina 801, Santiago, Chile 7500557
Tel: (562) 341-7027, (562) 269-0620
Fax: (562) 209 5837

- **WWF Chile**

Contact: *Emily Owen, Sistemas de Información Geográfica*
Correo electrónico: emily.owen@wwf.cl
Correo: *Carlos Anwandter 624, Casa 4, Valdivia, Chile*
Tel. *56-63-244590*
Fax *56-63-222749*
www.wwf.cl
www.panda.org

Potential partners in Argentina include:

- ***Fundación Vida Silvestre Argentina***

Contact person: Pablo Herrera
Email: granchaco@vidasilvestre.org.ar
Website: www.vidasilvestre.org.ar
Tel: (54 11) 4331-3631 / 4343-4086
Fax: (54 11) 4331
Address: Defensa 251 Piso 6 "K" (C1065AAC) Buenos Aires, Argentina.

- ***Fundación Patagonia Natural***

Contact: Guillermo (Graham) Harris
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Email: pnatural@patagonianatural.org

- ***Ecosistemas Argentino***

Contact person: Daniel Renison, President
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- ***Laboratorio de Investigaciones Ecológicas de las Yungas (LIEY) and Instituto de Ecología Regional (IER), Universidad Nacional de Tucumán***

Contact person: Director, Alfredo Grau, graualfredo@gmail.com
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- ***Fundacion ProYungas***

Sede Tucumán

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Sede Salta

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Sede Jujuy

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Alvear 678 - oficina 23 - (4600) San Salvador de Jujuy, Jujuy, Argentina.

- ***Acción por la Biodiversidad***
Contacts: Carlos Alberto Vicente y María Eugenia Jeria
Website: Biodiversidad en América Latina, www.biodiversidadla.org
Address: Gianone 195 (1727), Marcos Paz, Buenos Aires, Argentina
Telefax: (54 220) 477 1165
E-mail: info@biodiversidadla.org
- **Red Nacional de Acción Ecologista**
Contacts: CeProNat - cpronat@yahoo.com.ar, inticuyum@yahoo.com.ar
Website: www.renace.net/index.htm

Potential partners in Bolivia include:

- ***FAN (Fundación Amigos de la Naturaleza)***
Contacts: Director, Karin Columba, kcolumba@fan-bo.org,
Science coordinator, Natalia Araujo, naraujo@fan-bo.org
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Dirección: Km. 7 1/2 Doble vía a la Guardia
Ubicación: Santa Cruz de la Sierra Bolivia
Teléfono: (591)-3-3556800
Fax: (591)-3-3547383
- ***Asociación para la Biología de la Conservación-Bolivia***
Contact person: Odette Fukushima
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Address: La Paz, La Paz, 11650, Bolivia
- ***Tropico: Asociación Boliviana para la Conservación***
Contact person: Dirección Ejecutiva, Patricia Ergueta: perqueta@tropico.org
Website: www.tropico.org
Email: tropico@tropico.org,
Phone: (591-2) 2375371
Address: Juan Jose Perez 268 P.1 Sopocachi, La Paz 11250, Bolivia
- ***Grupo Nature***

Contact person: Vladimir Alvarado: vladimiralvarado@grouponature.org
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Phone: 0-72531079
Address: Casilla: 284, Tarija , Villa Avaroa, calle Litoral 419,Santa Cruz, Av.Brasil N°71, Bolivia

Potential partners in Paraguay include:

- ***Coordinadora de Conservación y biodiversidad Fundación DESDELCHACO***
Contact person: Laura Villalba [lvillalba@desdelchaco.org.py]
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Phone: 52191/52235
Website: www.desdelchaco.org.py
- ***Natural Land Trust, Paraguay***
Contact person: Ana Maria Macedo Sienra, Directora Ejecutiva
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Tel/Fax: (595) 21 610 427, Cel: 0981 445 221
Email: amacedo@naturalparaguay.org
Website: www.naturalparaguay.org

Potential partners in Uruguay include:

- ***El Programa de Conservación de la Biodiversidad y Desarrollo Sustentable en los Humedales del Este (PROBIDES)***

Contacts:

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Address: Ruta 9 km 205. Rocha, Uruguay.
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Email: probides@probides.org.uy
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- **Karumbe**
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Website: www.karumbe.org/

Administration Oversight and Monitoring

PBI will have the primary administration, oversight and monitoring role on this project, but the partner NGOs will assist in this task. This is one of the incidental ways that this project can help build conservation efforts in other countries. In particular, this effort will bring together representatives of many countries in a unique collaborative effort. This alone should have a major effect in furthering conservation efforts in South America.

Part of the education component will include support for presentations and other public outreach by NGOs in their own countries where local conservation efforts need a voice.

Budget and Funding

Funding for Year 1 of this project will come primarily from the PBI special projects fund. Additional in-kind support may come from some of our initial project partners. Subsequent funding will be solicited from other potential project partners (Google, ESRI, Rainforest Concern, TNC, IUCN, WWF etc) and from individual donors and private conservation foundations. PBI may also choose to provide additional funding through the multi-year project period.

We have developed a realistic project budget that is based on extensive preparation work we already done on this project and the extensive experience with similar projects in the USA. There are difficulties working on such a project in South America that we did not encounter in our previous work in the USA, but these difficulties can be surmounted within the proposed budget and through the collaboration we expect from other organizations. The projected budget is consistent with our past experience. It incorporates improvements in efficiency brought about by advancements in technology and capitalizes on PBI's previous experience in this field.

Organization building aspects of the project

Our intention is that this project will help build and enhance the organizations that we partner with in Latin America. We will provide these organizations material, scientific and technical aid and support. We will provide partner organizations with critical support for their organizational development.