CRITICAL ECOSYSTEM PARTNERSHIP FUND

Ecosystem Profile

Tropical Andes Biodiversity Hotspot

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ABOUT THE CRITICAL ECOSYSTEM PARTNERSHIP FUND

The Critical Ecosystem Partnership Fund (CEPF) provides grants to nongovernmental and private sector organizations so they can conserve some of the most biologically diverse yet threatened ecosystems—the world's biodiversity hotspots. The investments are even more meaningful because these regions are home to millions of people who are impoverished and highly dependent on natural resources.

The fund is a joint program of l'Agence Française de Développement, Conservation International, the European Union, the Global Environment Facility, the Government of Japan, the MacArthur Foundation and the World Bank.

Enabling civil society groups to have stronger voices and exert greater influence in the world around them is the hallmark of our approach. Our grantee partners range from small farming cooperatives and community associations to private sector partners, and national and international nongovernmental organizations (NGOs).

Our grants:

- Target biodiversity hotspots in developing and transitional countries, and address many of the U.N. Convention on Biological Diversity's Aichi Targets, which are designed to save global biodiversity and enhance its benefits to people.

- Are guided by regional investment strategies — ecosystem profiles — developed with local stakeholders.

- Go directly to civil society groups to build this vital constituency for conservation alongside governmental partners. Grants are awarded on a competitive basis to implement the conservation strategy developed in each ecosystem profile.

- Create working alliances among diverse groups, combining unique capacities and eliminating duplication of efforts.

- Achieve results through an ever-expanding network of partners working together toward shared goals.

To date, we have supported more than 1,900 civil society groups and individuals in 89 countries and territories.

EXECUTIVE SUMMARY

The Tropical Andes Hotspot comprises the Andes Mountains of Venezuela, Colombia, Ecuador, Peru, Bolivia and the northern tropical portions within Argentina and Chile. It covers 158.3 million hectares, an area three times the size of Spain. It is one of 35 global biodiversity hotspots, defined as those regions that have at least 1,500 endemic plant species and have lost more than 70 percent of their natural habitat. These 35 hotspots cover only 2.3 percent of the Earth's surface but contain a disproportionately high number of species, many of which are threatened with extinction. Given their strategic importance, hotspots serve as global priorities for conservation.

The Tropical Andes stands unequaled among the 35 hotspots as measured by species richness and endemism. It contains about one-sixth of all plant life in the world, including 30,000 species of vascular plants, making it the top hotspot for plant diversity. It has the largest variety of amphibians with 981 distinct species, of birds with 1,724 species, of mammals at 570 species, and takes second place after the Mesoamerica Hotspot for reptile diversity at 610 species.

The hotspot also is noteworthy for its ecosystems services. It is the water source for the main stems of both the Amazon and Orinoco rivers, the world's largest and third largest rivers by discharge. Its rivers provide water for the capital and industrial cities and for agriculture, and for energy in western South America, including for its 57 million citizens. Its forests store 5.4 billion tonnes of carbon, equivalent to the annual carbon emissions of 1 billion cars.

The Andes also is known for its exceptional cultural diversity. It is home to more than 40 indigenous groups who descend from one of the world's six independent human civilizations. Today, indigenous populations play important roles in economic activities, politics, land use and stewardship, and as such, are important allies in biodiversity conservation. Moreover, lands owned or reserved for indigenous peoples and communities total over 82 million hectares, which represents over 52% of the hotspot's land area. Unfortunately, poverty, income inequality, and limited access to basic services persist in many rural indigenous, Afro-descendant, and mestizo communities. Across the hotspot there are great disparities in wealth. According to the Andean Community, a regional trade bloc, efforts to reduce poverty in the region have been successful but overall poverty rates remain at more than 30 percent for the general population and more than 60 percent in the rural areas.

Despite its rich biodiversity, the hotspot also ranks as one of the most severely threatened areas in the tropics, with a large portion of its landscape having been transformed. The northern Andes, with the fertile inter-Andean valleys of Colombia and Ecuador, are the most degraded as a result of agriculture and urbanization. Forests remain in the higher and more inaccessible areas. In contrast, extensive forests and grasslands remain in Peru and Bolivia, as agriculture and grazing is less intense. Even in those countries, however, recent road improvements and expansion are resulting in forest conversion and fragmentation.

These threats directly jeopardize the hotspot's biodiversity. The profile identifies 814 globally threatened species, the highest number of any hotspot, but still only a sub-set of the true number because only amphibians, birds and mammals have been systematically assessed for the region. Another 1,314 species occur in ranges so small as to be highly susceptible to rapid population declines. The Andes has 442 sites covering 33.2 million hectares known as key biodiversity areas (KBAs), where these threatened species are known to survive. Only the Indo-Burma Hotspot has more KBAs at 509 sites. The Andes has 116 Alliance for Zero Extinction (AZE) sites, areas that encompass the last remaining populations of the most endangered and irreplaceable species. Unfortunately, the profile finds that only 44 percent of the area under KBA designation, totaling 15.1 million hectares, is fully protected. The remaining 56 percent, totaling 18.8 million hectares, is only partially protected or completely unprotected. Of the 116 AZE sites, 63 sites are not protected. A 2013 study in *Science* identified Colombia's Sierra Nevada de Santa Marta Natural National Park as the most "irreplaceable" protected area in the world based on its sheltering more than 40 endemic species, many of which are threatened with extinction.

Ambitious infrastructure development and extractive industry are changing the landscape and are expected to propel massive transformation in the future. Under the South American Regional Integration Initiative (IIRSA), 65 infrastructure projects were either in construction or being planned in 2013 in sites that may have direct and/or indirect impacts in the KBAs. These projects are mostly for road construction and carry a $12 billion budget. Hotspot countries invest on average $125 billion a year in infrastructure development. Juxtaposed to this infrastructure development is large-scale private and foreign investment, mostly for extractive industries. For example, China invested $99.5 billion from 2005 to 2013 for mining, infrastructure and hydrocarbon development in the Andean countries. The combination of the expansion in mining, road and dam construction, cattle grazing and agricultural encroachment, compounded by the impacts of climate change, are predicted to cause profound environmental change, particularly if conservation and sustainable development are not prominent within national and regional development agendas.

The seven nations of the Andes have responded to the environmental challenges by strengthening their national environmental agencies and policies over the last decades. New environmental ministries and policies have been established and additional funding allocated for environmental protection. There also has been a trend toward decentralization of authority for environmental management to local and regional governments, empowering local stakeholders to take an active role in land and resource management. Funding has also increased from multiple donor agencies. From 2009 to 2013, national governments and international donors channeled $614.4 million for a wide variety of resource management projects and operations. Of this amount, $336 million was allocated for activities that had biodiversity conservation as a principal objective for the five-year period, of which civil society received $45 million for their conservation projects. The profile finds that $45 million of donor funding was channeled to civil society groups for biodiversity conservation, which averages $1.3 million per year per country channeled directly to local and national conservation groups. Funding for biodiversity conservation is a small fraction of the hundreds of billions of dollars invested for large-scale development projects that have the potential to permanently transform large parts of the hotspot.

While governance for environmental protection has improved in recent decades, concerns still remain. A worrisome trend has emerged recently in some countries, as environmental policies and institutions have been relaxed and even dismantled in the name of unhindering regulations that get in the way of economic growth. A general consensus exists that biodiversity considerations are poorly valued in development planning and investment decision-making.

Infrastructure and extractive activities are widely viewed as lacking sufficient social and environmental safeguards to ensure their sustainability, leading to highly public environmental and social conflicts in several countries. While decentralization holds the promise of more effective resource management, local governments frequently lack the technical and financial wherewithal to fulfill their environmental duties.

Andean civil society has been at the forefront of conservation over recent decades, serving as environmental leaders and implementers of successful conservation and sustainable development projects. The 133 environmental organizations identified in the ecosystem profile demonstrate significant expertise, field experience, and the ability to bring various sectors together -- attributes that make the Andes a global leader in innovative approaches to conservation. The Andes has a history of innovation arising from the NGO sector, having launched the first debt-for-nature swap in Bolivia, for example. Today, Andean NGOs remain innovators in such fields as REDD+ and payments for ecosystem services.

However, to realize their full potential to address the scale of the conservation challenge in the Andes, significant resource and capacity limitations still need to be overcome. In all hotspot countries, subnational and local organizations have significant shortfalls in technical staff, administrative capacity, funding, and communications capability. Even national groups face funding challenges. Some groups struggle to remain open, while others have closed in recent years.

CEPF Niche and Investment Strategy

CEPF prepared the ecosystem profile for the Tropical Andes between September 2013 and September 2014, through a process that involved the participation of more than 200 people through eight workshops in all seven Andean countries.

The CEPF investment niche is to enable local indigenous, Afro-descendent, mestizo, and environmental civil society groups to serve as effective advocates for and facilitators of multi-stakeholder approaches that promote biodiversity conservation and sustainable development in the Tropical Andes Hotspot. Civil society organizations stand in an excellent position to bridge biodiversity conservation and sustainable development with goals of economic growth. Collectively, they understand the needs and aspirations of local people, have technical expertise and field experience in linking biodiversity conservation with local development, and have a long track record of leadership in advocating for environmental and social sustainability.

The niche calls for supporting civil society groups at two mutually-dependent levels of action in the highest priority KBAs and corridors of the hotspot:

- At the **site level**, CEPF will seek to put place the enabling conditions required to achieve long-term conservation and sustainable development in the highest priority KBAs. Support will target traditional management planning and implementation in protected areas. In unprotected sites, CEPF will promote appropriate land management designations, secure land tenure, and planning frameworks to foster a development path that is based on sustainability. At the same time, CEPF will support the development of incentive schemes that offer tangible benefits to local communities from biodiversity conservation and sustainable resource management.

- At the **corridor level**, CEPF will work to ensure subnational governance frameworks -- specifically with provincial, departmental, state, and municipal governments where responsibility for resource management has been decentralized -- to support sustainable development by mainstreaming biodiversity conservation into policies, projects and plans undertaken by the private sector and governments.

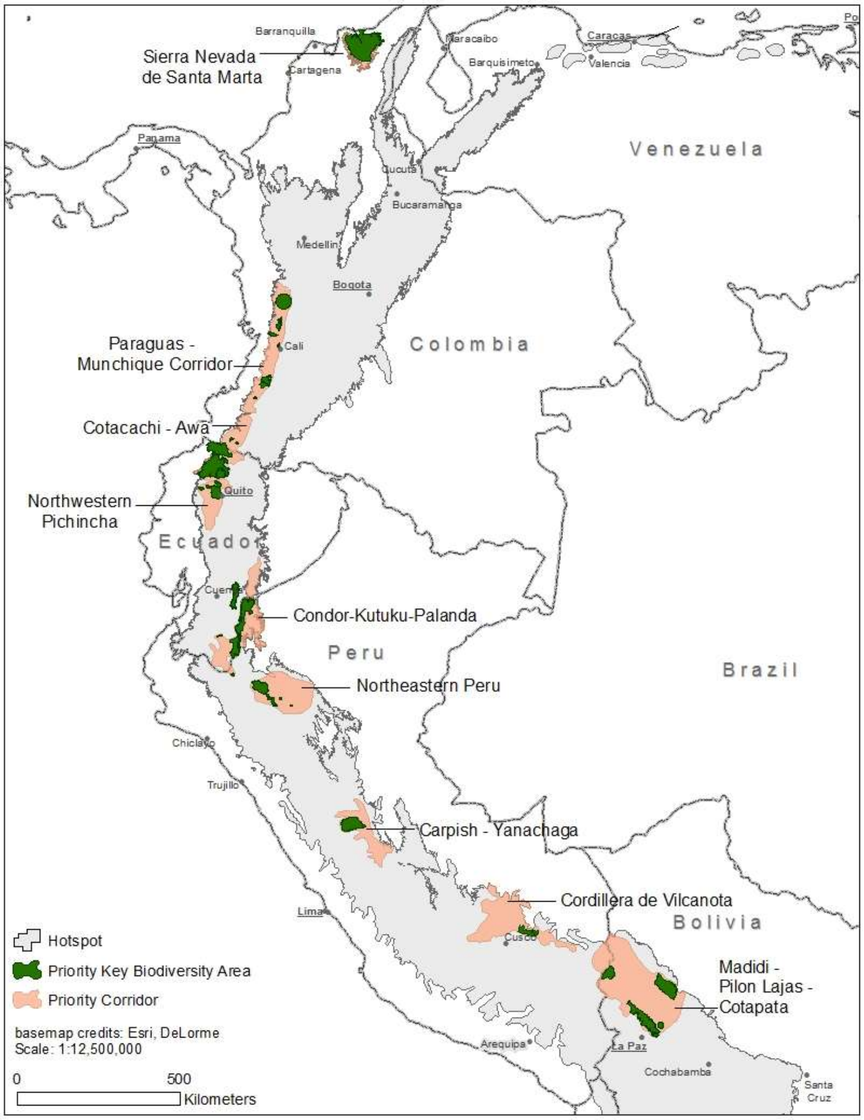
    - For the public sector, CEPF will support efforts with sub-national governments to mainstream biodiversity conservation and sustainable development into landscape-scale public policy planning and implementation frameworks. Special emphasis will be placed on ensuring the social and environmental sustainability of large development projects and mainstreaming biodiversity conservation into broader development programs and financing schemes.

    - For the private sector, CEPF will support opportunities to strengthen and scale up the linkage between conservation and income generation, such as for coffee and ecotourism. It will seek to scale up private sector financing for conservation. CEPF will also promote constructive approaches to engage extractive industries and infrastructure developers to ensure that social and environmental safeguards are adopted for development schemes that put the KBAs at risk.

The CEPF niche calls for integrating two crossing-cutting themes into all relevant grant-making objectives and programming: mainstreaming climate change resilience and strengthening capacities for indigenous people and Afro-descendants. CEPF will seek to ensure the sustainability of the results achieved through capacity building of those civil society partners that are strategically positioned to achieve CEPF conservation outcomes. Furthermore, building local capacities and mechanisms for sustainable financing will be paramount importance, as will leveraging funding from existing incentive programs, such as Ecuador's Socio Bosque program. The niche also recognizes that CEPF's role will need to be highly catalytic, to foster multi-stakeholder alliances and to leverage new and existing resources to launch and/or strengthen a development path that integrates the conservation of biodiversity and ecosystem services with economic growth.

A total of 814 species, 442 site and 29 corridor outcomes are defined for the hotspot. To ensure the greatest incremental benefit with the funding available, CEPF investment will focus on 36 of the highest-priority KBAs found in seven conservation corridors, to help safeguard 171 globally threatened species from extinction (see Figure X.1). Many of 36 priority KBAs overlaps with indigeneous of Afro-descendant territories and are important for their ecosystem services. While all KBAs are urgent priorities for conservation action and in need of investment and management attention, they also have a high potential for conservation success.

Figure X.1. Priority KBAs and Corridors for CEPF Investment in the Tropical Andes Hotspot



The CEPF investment strategy to achieve the conservation outcomes is presented in Table X. 1. The strategy covers a five-year period and has been designed to complement investments by the other funders. Within the investment strategy, seven strategic directions and corresponding investment priorities will directly guide grant making.

Table X. 1. Strategic Directions and Investment Priorities for CEPF in the Tropical Andes Hotspot

Strategic Directions	Investment Priorities
1. Improve protection and management of 36 priority KBAs to create and maintain local support for conservation and to mitigate key threats.	1.1 Support preparation and implementation of participatory management plans that promote stakeholder collaboration in managing protected KBAs.
	1.2 Facilitate the establishment and/or expansion of indigenous, private, and subnational reserves and multi-stakeholder governance frameworks for conserving unprotected and partially protected KBAs.
	1.3 Strengthen land tenure, management, and governance of indigenous and Afro-descendant territories.
	1.4 Catalyze conservation incentives schemes for biodiversity conservation for local communities
2. Mainstream biodiversity conservation into public policies and development plans in seven corridors to support sustainable development, with a focus on sub-national governments.	2.1 Support land-use planning and multi-stakeholder governance frameworks that create shared visions for integrating biodiversity conservation and ecosystem services into the corridor-level development
	2.2 Integrate biodiversity objectives into development policies, programs, and projects that impact resource use, including climate change, agricultural development, and water resources
	2.3 Promote traditional and innovative financial mechanisms for conservation, including payments for ecosystem services, leveraging of rural and micro-credit, mainstreaming biodiversity into climate change programs, [illegible]
3. Promote local stakeholder engagement and the integration of social and environmental safeguards into infrastructure, mining and agriculture projects to mitigate potential threats to the KBAs in the seven priority corridors.	3.1 Build local capacity and facilitate public consultation and alliance building in the assessment, avoidance, mitigation, and monitoring of environmental impacts of large development projects that pose a direct or indirect risk to the KBAs.
	3.2 Encourage constructive approaches to promote environmental and social sustainability of infrastructure, mining, and agriculture projects through partnerships between civil society groups, the private sector, and international investors
	3.3 Integrate biodiversity objectives into development policies, programs, and projects related to mining, infrastructure, and agriculture
4. Promote and scale up opportunities to foster private sector approaches for biodiversity conservation to benefit priority KBAs in the seven corridors.	4.1 Promote the adoption and scaling up of conservation best practices in those enterprises compatible with conservation to promote connectivity and ecosystem services in the corridors.
	4.2 Encourage private sector partners and their associations to integrate conservation their business practices and implement corporate social responsibility policies and voluntary commitments
	4.3 Leverage of private-sector financing schemes, such as carbon projects and green bonds that benefit the conservation outcomes.
5 Safeguard globally threatened species.	5.1 Prepare, help implement, and mainstream conservation action plans for the priority Critically Endangered and Endangered species and their taxonomic groups.

	5.2 Update KBA analysis for mainstreaming to incorporate new AZE sites and Red Listing of reptiles, freshwater species and plants, based on addressing several high-priority information
6 Strengthen civil society capacity, stakeholder alliances and communications to achieve CEPF conservation outcomes, focusing on indigenous, Afro-descendent and mestizo groups	6.1 Strengthen the administrative, financial and project management, and fundraising capacity of civil society organizations and indigenous and Afro-descendent authorities to promote biodiversity conservation in their territories.
	6.2 Enhance stakeholder cooperation, alliance building and sharing of lessons learned to achieve CEPF's conservation outcomes, including efforts to foster hotspot-wide information sharing.
	6.3 Strengthen capacity in communications of CEPF partners to build public awareness of the importance of the conservation outcomes.
	6.4 Pilot and scale up promising approaches for the long-term financing of local and national civil society organizations and their conservation missions.
7 Provide strategic leadership and effective coordination of CEPF investment through a regional implementation team.	7.1 Operationalize and coordinate CEPF's grant-making processes and procedures to ensure effective implementation of the investment strategy throughout the hotspot.
	7.2 Build a broad constituency of civil society groups working across institutional and political boundaries toward achieving the shared conservation goals described in the ecosystem profile.
	7.3 Engage governments and the private sector to mainstream biodiversity into policies and business practices.
	7.4 Monitor the status of biogeographic and sectoral priorities in relation to the long-term sustainability of conservation in the
	7.5 Implement a system for communicating and disseminating information on conservation of biodiversity in the hotspot.

Success for CEPF will be defined at the end of the investment period when each of the seven corridors has made meaningful progress toward instituting key enabling conditions for conserving biodiversity and ecosystem services for the long term. Among the conservation results to be achieved, CEPF will aim to improve management in 36 priority KBAs. It will aim to support planning frameworks and management and governance capacity in eight indigenous territories to support improved community well-being and biodiversity conservation. Furthermore, CEPF wil seek to pilot and scale up successful models to mainstream conservation and sustainable development into private sector initiatives. Support will also result in consensus-based land-use plans, policies and capacities in place to guide decision-making in support of economic development that is compatible with biodiversity conservation. At least 50 NGOs and civil society groups will have improved institutional capacity to achieve conservation outcomes. Andean conservation groups will have the capacity for hotspot-wide networking and information exchange, for meaningful collaboration on common priorities, and for ensuring their own financial sustainability. At least 25 Critically Endangered or Endangered species will have conservation action plans that are developed, in implementation, and adopted by a government entity or other donor to ensure its sustainability.

1. INTRODUCTION

Founded in 2000, the Critical Ecosystem Partnership Fund (CEPF) is designed to ensure civil society is engaged in biodiversity conservation. It is a joint initiative of l'Agence Française de Développement, Conservation International (CI), the European Union, the Global Environment Facility (GEF), the Government of Japan, the John D. and Catherine T. MacArthur Foundation, and the World Bank. CI, as one of the founding partners, administers the global program through the CEPF Secretariat.

CEPF is unique among funding mechanisms in that it focuses on biological areas—the world's biodiversity hotspots—rather than political boundaries and examines conservation threats on a landscape-scale basis. A fundamental purpose of CEPF is to ensure that civil society is engaged in efforts to conserve biodiversity in the hotspots, and to this end, CEPF provides civil society with an agile and flexible funding mechanism complementing funding currently available to government agencies.

CEPF promotes working alliances among community-based organizations (CBOs), nongovernmental organizations (NGOs), government, academic institutions and the private sector, combining unique capacities and eliminating duplication of efforts for a comprehensive approach to conservation. CEPF targets transboundary cooperation for areas of rich biological value that straddle national borders or in areas where a regional approach may be more effective than a national approach.

Biodiversity and Civil Society

Biodiversity forms a key element of the environment that underpins human well-being, and its loss diminishes human life and opportunities. Healthy, biodiverse ecosystems provide life-sustaining resources, such as clean air, fresh water, a stable climate and healthy soils. Despite recognition of this, loss of biodiversity is accelerating globally (Butchart *et al.* 2010).

There are many reasons for this contradiction between acknowledging the value of biodiversity while allowing its destruction in pursuit of economic growth, but fundamentally it stems from the choices of individuals based on the range of options available to them. Conservation, therefore, is about changing people's perspectives and goals, so they make decisions that favor the maintenance of biodiversity and the sustainable use of resources.

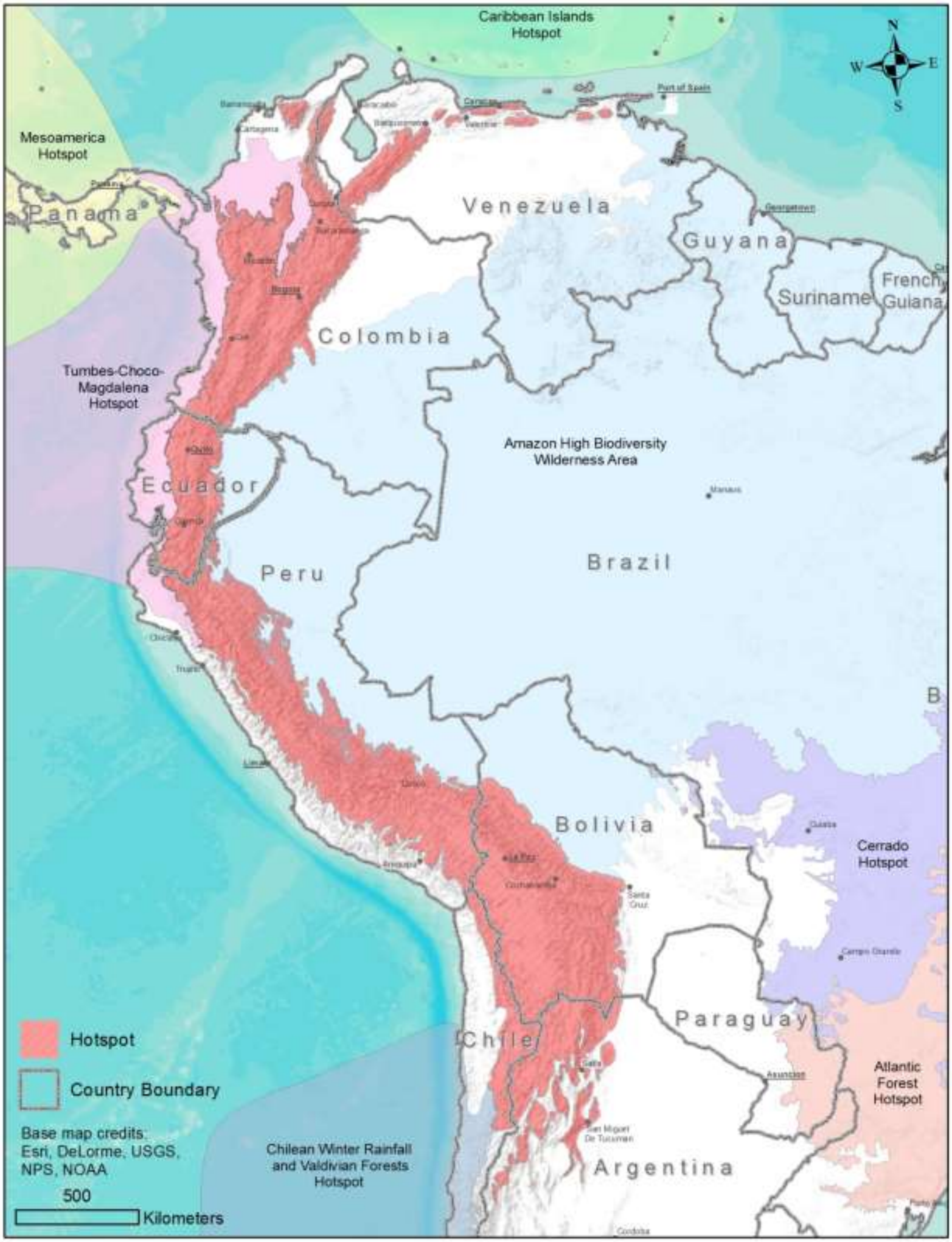
Civil society organizations (CSOs) are in a unique position to influence people's choices because they are based within their communities. Unlike government, CSOs have no power to compel people to change, so they have learned to influence choices and behavior by combining education and incentives, and by helping people achieve their aspirations for development while taking a long-term perspective on the environment. Not surprisingly, many local communities possess knowledge and practices that are essentially pro-environment, and by working together on issues that are obstacles to their development, such as land rights or access to health and education services, they can simultaneously achieve conservation goals.

Biodiversity and the threats to it are not distributed evenly over the face of the globe. Conservation organizations can maximize the effectiveness of their limited funds by focusing on the places that are the most important and where action is most urgent. One of the most influential priority setting analyses was the identification of biodiversity hotspots (Myers *et al.* 2000, Mittermeier *et al.* 2004), defined as regions that have at least 1,500 endemic plants species and have lost at least 70 percent of their natural habitat. There are 34 hotspots globally, covering 15.7 percent of the earth's surface. The intact natural habitats within these hotspots cover only 2.3 percent of the world's surface, but contain half of all plants and 77 percent of all terrestrial vertebrates. There are five hotspots in South America: Tropical Andes, Tumbes-Chocó-Magdalena, Atlantic Forest, Cerrado and Chilean Winter Rainfall and Valdivian Forests.

The majority of hotspots are in tropical countries that struggle with issues of poverty and human development, and where local conservation efforts suffer from the shortage of funds and support. The Critical Ecosystem Partnership Fund was established in 2000 to channel funding to civil society organizations in this subset of hotspots in developing countries. CEPF's goals are to support civil society to engage in action for the conservation of globally important biodiversity while building capacity and enhancing human livelihoods.

In 2013, the CEPF Donor Council selected the Tropical Andes (Figure 1.1) as eligible for funding. Before launching any grants program, CEPF commissioned the preparation of this document, an ecosystem profile of the hotspot. The profile presents a snapshot of the current

Figure 1.1. Location of the Tropical Andes Hotspot



state of the hotspot, identifying priorities and opportunities for action. It was developed by compiling published information, consulting with experts, and engaging in discussions with governments, CSOs and local communities across the region. In all, more than 200 people contributed their time and knowledge over twelve months, November 2013–October 2014.

CEPF Investment in the Tropical Andes, 2001–2013

The current ecosystem profile builds on the results achieved and lessons learned from CEPF's previous investments in the Tropical Andes, which spanned two periods, from 2001 to 2006 and from 2009 to 2013. Phase I investments, which totaled $6.13 million, targeted the Vilcabamba-Amboró conservation corridor of southern Peru and northern Bolivia, a 30-million hectare swath of forested landscapes that covers almost 20 percent of the hotspot area, where conservation actions were still largely nascent at the time. CEPF selected the corridor due to the large extensions of well-preserved forests that presented excellent opportunities for conservation, juxtaposed to looming threats that put these areas at risk if conservation actions were not taken.

Several seminal achievements resulted in this first phase:

- More than 4.4 million hectares were brought under legal protection through the declaration of nine new national parks, indigenous reserves, private protected areas, and Brazil nut concessions. Furthermore, 17 protected areas covering nearly 10 million hectares experienced management improvements through a wide range of conservation initiatives.
- CEPF introduced innovative grassroots livelihoods projects compatible with biodiversity conservation, helping indigenous and mestizo communities to generate new sources of income. As one example, CEPF was the first donor to provide significant support to Brazil nut collectors of Madre de Dios, which resulted in formal land rights to 130 nut gatherers and the sustainable management of 225,000 hectares of forest vital to landscape connectivity.
- CEPF's binational corridor-level vision led to a more integrated approach to developing landscape-scale conservation strategies and to increased collaboration between major stakeholders, including government agencies and civil society organizations from Peru and Bolivia. This broader approach represented a departure from earlier conservation initiatives that often were treated in isolation, had weak collaboration, and lacked common goals to integrate protected areas within a larger corridor framework.
- Environmental leaders and institutions developed new capacities to meet the conservation challenges of the region. For example, support to the Sociedad Peruana de Derecho Ambiental (SPDA) resulted in Peru's first private protected areas, which proved so successful that it has been adopted across the country. Since its first CEPF grant, SPDA continues operate in the region. Local environmental and indigenous leaders also emerged and remained at the forefront of efforts to promote the sustainable development of their regions.

Phase II investments totaled $1.79 million and targeted the smaller Tambopata-Pilón Lajas sub-corridor between Peru and Bolivia. The objective was to support local civil society groups to mitigate the expected impacts from upgrading two dirt roads to highways—the Southern Inter-Oceanic Highway in Peru and the Northern Corridor Highway in Bolivia. While economic opportunities were expected to emerge from the projects, the upgrading also was expected to fuel migration, deforestation, land invasion, hunting and mining. In the course of Phase II implementation, the sub-corridor experienced a significant rise in illegal mining and deforestation.

Under the second phase, CEPF grantees demonstrated the efficacy of empowering local civil society to advocate environmental and social sustainability, particularly with respect to infrastructure projects.

In Phase II, CEPF investments helped to lay a foundation to promote conservation and to mitigate negative impacts from these infrastructure projects to help achieve several notable results:

- The core areas of five protected areas covering 4.4 million hectares remained intact, withstanding strong pressure from gold mining, agricultural encroachment, and logging.
- Capacity building of indigenous and mestizo communities and local environmental groups allowed them to proactively engage in road design planning and impact monitoring, and thereby, to successfully advocate for adherence to environmental and social safeguards. Community-based mechanisms developed under CEPF demonstrated the efficacy of working at the community level when dealing with infrastructure projects. Furthermore, agroforestry projects, particular for cacao and Brazil nuts, offered communities living next to the roads opportunities to maintain forest cover and increase their income.
- Support to 11 multi-stakeholder alliances and numerous local civil society groups helped to integrate environmental and social safeguards and conservation goals into eight regional and national policies related to highway and dam development, gold mining, private protected areas, sustainable financing, logging concessions and REDD+.

In both investment phases, CEPF collaborated closely with the Bolivian and Peruvian national environmental trust funds of FONDAM, FUNDESNAP, and PUMA, leveraging approximately $2 million in additional funding for CEPF grants.

Through CEPF, partners realized many important objectives that put the Vilcabamba - Amboró corridor on a stronger conservation trajectory. However, several key threats remain to this day, and new ones have emerged, which together pose profound challenges to the future of biodiversity and local communities of the hotspot, as the ecosystem profile describes in more detail. Given the operating milieu, the role of local environmental and social civil society groups remains critical to ensure that future development in the Tropical Andes takes into full consideration the vital role of the hotspot's ecosystem services and biodiversity, as well as the needs and aspirations of indigenous, Afro-descendent, and mestizo communities, which often have not benefitted to the extent possible from the hotspot's rapid economic growth.

CEPF's investments in the Tropical Andes provide a firm foundation and important lessons upon which to launch a new investment phase in the Andes at this time. CEPF's Donor Council therefore directed the CEPF Secretariat to undertake a new ecosystem profiling process, one that would cover the entire hotspot.

The ecosystem profile summarizes and analyzes a wealth of biodiversity and socioeconomic data for a region of immense value for global conservation efforts and human wellbeing. Although the primary purpose of the profile is to provide a strategy for CEPF investment in the Tropical Andes, it also is designed to serve other donors, government agencies, civil society organizations, and private sector groups to help develop their strategies and programs. As the subsequent chapters make clear, the biodiversity value of the Tropical Andes is very high, but so too are the threats. Coordinated efforts among multiple institutions are required to confront the challenges facing the region today.

2. BACKGROUND

Under the coordination of CEPF, the development of this ecosystem profile and investment strategy for the Tropical Andes Hotspot was conducted by NatureServe, a nonprofit organization that focuses on providing the scientific basis for conservation actions, in collaboration with EcoDecisión, an Ecuador-based social enterprise dedicated to developing new ways to finance conservation. Preparation began formally with the effort's launch on September 30, 2013, through an announcement that was widely circulated in both English and Spanish to conservation professionals, academics, government officials and donors who work in the hotspot countries. The announcement also appeared on the CEPF and the Spanish-language *Environmental Services Network* (*Redisas*) Facebook pages and Twitter feeds.

The profiling process involved a compilation of existing electronic data sets on biodiversity, climate, threats, landscape condition, and ecosystem services and an extensive consultation process with stakeholders from throughout the hotspot. The profiling team performed research and analysis at the country level to generate draft biodiversity priorities and key socioeconomic and policy factors that were subsequently reviewed by national experts from the seven countries within the hotspot in workshop settings. During the workshops, participants reviewed preliminary delineation of KBAs, identified priority threats and key actors, proposed strategies to promote conservation in the KBAs, and described existing conservation funding mechanisms available in the country. The development of the final profile took place through a three-step process: preliminary data compilation and analysis, stakeholder consultation, and final production and approval.

2.1 Preliminary Data Compilation and Analysis

The profiling team first generated a summary of baseline information describing relevant factors (*e.g.*, climate, biodiversity, socioeconomic, policy, investment, threats) that influence conservation opportunities and limitations in the ecosystems of the Tropical Andes Hotspot. A major activity was the definition of conservation outcomes in the hotspot using standard KBA analysis (Langhammer *et al.* 2007).

To ensure acquisition of the most relevant and up-to-date socioeconomic, policy and civil society information, in-country experts were consulted (Appendix 1). The profiling team prepared a standard framework for the experts to complete in order to gather qualitative and quantitative data in a consistent manner, allowing tabulation, cross-country comparisons and subsequent review at the stakeholder consultation workshops.

2.2 Stakeholder Consultation

Stakeholder consultation included an external Advisory Committee, national stakeholder consultation workshops, meetings with stakeholders, and a final regional consultation workshop. The external Advisory Committee was comprised of six internationally known experts on diverse aspects of Andean conservation (environmental policy, socioeconomics, conservation planning and private sector involvement) and was formed to provide guidance and inform key decisions during the profiling process (Appendix 2). Specifically, the Advisory Committee provided input on the format and agenda of the stakeholder consultation workshops, reviewed preliminary conservation outcomes and strategies, reviewed drafts of the profile, and provided input on technical issues that came up during the profiling process. The Advisory Committee met through conference calls on four occasions. Members who could not attend the calls provided written feedback to information sent prior to each conference call.

The profiling team organized a stakeholder consultation workshop with national experts in each of the seven countries of the hotspot. The objectives of the workshops were to enhance and improve preliminary information, identify key threats and suggest conservation strategies, and provide information on conservation financing and civil society. The workshop also served to inform stakeholders of and garner their support for the profiling process and outcomes. Workshop participants were carefully selected to provide diverse experiences and perspectives from different parts of the hotspot within each country. In advance of the workshops, participants received the workshop agenda and key thematic questions to best prepare them to transmit their knowledge and concerns.

A total of 163 national experts participated in these seven workshops. The names of all of these participants are listed at the beginning of this report. The seven two-day workshops (with the exception of Venezuela where the workshop was a single day) took place during the period mid-November 2013 through early February 2014 (Table 2.1). To increase attendance, the workshops were held in a central location in the capital city of each country except Argentina, where the workshop was held in the northern city of Tucuman to increase participation of experts living and working within the Tropical Andes Hotspot. The participants included representatives of national and regional governments and civil society (local and international conservation NGOs, economic and community development NGOs, academic institutions, indigenous organizations, and representatives of the private sector concerned with the sustainable use of natural resources). The number of workshop participants was highest in those countries where the hotspot comprises a large part of the land area (Colombia, Ecuador, Peru, Bolivia) and somewhat less in countries at the geographical extremes of the hotspot (Venezuela, Argentina, Chile).

Table 2.1. Stakeholder Consultation Workshops Held in the Tropical Andes Hotspot

	National Workshops							Regional Workshop
	Argentina	**Bolivia**	**Chile**	**Colombia**	**Ecuador**	**Peru**	**Venezuela**	**Ecuador**
Location where held (chronological order of workshop)	Tucuman (4)	La Paz (7)	Santiago (6)	Bogota (2)	Quito (1)	Lima (3)	Caracas (5)	Quito (8)
Date of workshop	Dec 10-11, 2013	Feb 6-7, 2014	Feb 3-4, 2014	Nov 19-20, 2013	Nov 14-15, 2013	Dec 5-6, 2013	Jan 28, 2014	September 18, 2014
No. of participants[1]	19	30	12	33	32	25	12	26

[1]Includes only in-country participants and excludes representatives from CEPF, NatureServe and EcoDecisión.

Stakeholder consultation workshops were led and moderated by the profiling team to effectively cover biological, social, governance, policy and investment aspects of the consultation. The workshop style and format that was used fomented active participation and interaction.

Furthermore, the use of standard-format questionnaires to capture breakout-group input permitted quick tabulation by the profiling team during the workshops to immediately highlight and share stakeholders' conservation priorities. Because the workshop methodology evolved somewhat through the consultation process, participants in the first two workshops (Ecuador and Colombia) were later asked to answer two additional multiple choice questions via the web-based survey tool *Survey Monkey* to gain additional information that had not been covered in those earliest workshops. Participants were asked to (a) rank effectiveness of public policy (by sector) to influence conservation in specific KBAs and (b) rank key civil society organizations according to their capabilities, based on human and financial resources. This information was gathered directly during the subsequent five workshops.

During the stakeholder consultation workshops, special themes relevant to the tropical Andes were covered, such as montane forests and biodiversity; water protection and management (páramos, wetlands, glaciers, rivers) to ensure clean water for towns/cities, agriculture, tourism, and other ecosystem services; effects of a changing climate on elevational distributions of species; status of indigenous populations and land ownership; and building civil society capacity to influence public policies to reduce threats to the diversity and function of natural systems. The output of these workshops included details on threats to specific species, sites and ecosystems; limitations to establishing or implementing policy and regulations; previous lessons learned; success stories with respect to protection of tropical Andean species and ecosystems and sustainable use of their benefits; and comments and suggestions for future needs and the CEPF conservation strategy.

In all countries, the profiling team met individually with stakeholders who could not attend the workshops; they represent the same kinds of civil society organizations and government agencies that attended the workshops, and their names and institutions are included in the list of experts at the beginning of the profile. The profiling team also met with other conservation donors funding efforts in the region. These meetings complemented the workshops by providing additional perspectives and information, especially on environmental policy, financing, the strength of civil society organizations, and leveraging opportunities.

Once the profile was drafted and a provisional strategy established, the profiling team held a one-day regional consultation workshop in Quito, Ecuador, on September 18, 2014, to review the document and consider conservation strategies from a regional perspective. This event brought together 26 representatives of donor agencies, government, and regional, national, and local civil society from the countries in the hotspot. Two members of the Advisory Committee attended this workshop. The outcomes of this meeting were then used to revise the draft profile and strategy.

2.3 Production and Approval

The profile was developed in close collaboration with the CEPF Secretariat, which reviewed all drafts. A full draft of the profile was circulated to stakeholders for review in advance of the September 2014 regional consultation workshop. The profile advisory committee also submitted comments on this draft. The CEPF Working Group then reviewed a subsequent draft in 11 December 2014. CEPF's Donor Council approved the profile in March 2015.

3. BIOLOGICAL IMPORTANCE OF THE HOTSPOT

3.1 Geography

The Tropical Andes Hotspot includes the longest and widest cool region in the tropics, covering more than 1.5 million kilometers squared, an area three times the size of Spain, covering extensive latitudinal ranges and occupying an elevation range from 500 meters to over 6,000 meters. Steep slopes, deep gorges, and wide valleys characterize the entire range, and a vast high mountain plain, the Altiplano, extends at elevations above 3,500 meters across much of southern Peru and western Bolivia. A large number of snow-capped peaks are found throughout the hotspot. The treeline lies between 3,800–4,500 meters near the equator and above 4,500 meters from 15º S to the southern limit of the hotspot. It forms the northern half of the world's longest continental mountain range.

From the north, the hotspot begins as a series of isolated areas in Venezuela in the Cordillera de la Costa (*cordillera* means range, and is used extensively in naming geological features in Latin America), a chain of geologically distinct small mountains that abut the northern South American coast. The hotspot extends to the west and south at the northern terminus of the Andes proper where two branches occur: the Cordillera de Merida and the Cordillera de Perijá, which forms a part of the border with Colombia. In Colombia, the Andes are divided into three ridges, which stem from a massif located at 2º N latitude, and are separated by two valleys running from south to north: the Magdalena Valley separates the Eastern from the Central Cordillera, and the Cauca Valley separates the Central from the Western Cordillera. The Eastern Cordillera, where the capital city of Bogotá is located, is the broadest of the three ridges. The Central Cordillera is the highest of the three ridges and contains several active volcanoes, some of them partially covered by snow (Fjeldså and Krabbe 1990). The narrow and relatively low Western Cordillera borders the northern portion of the Tumbes-Chocó-Magdalena Hotspot. The Tropical Andes Hotspot additionally includes the isolated Sierra Nevada de Santa Marta on the Caribbean coast of Colombia. With its highest point at 5,700 meters elevation, this massif is the highest coastal mountain in the world.

From southern Colombia south through Ecuador to 3º S latitude, the Andes form two parallel, north-south mountain chains, the Eastern and Western Cordilleras, that form a narrow (150–180 kilometers wide) range 600 kilometers long (Clapperton 1993). The two cordilleras of the Ecuadorian Andes are joined by a series of inter-Andean valleys at elevations above 2,000 meters.

In southern Ecuador and northern Peru, the Andes form an intricate mosaic of mountain systems, some of them running from north to south and others from east to west. Here, at the confluence of the Chinchipe River with the Marañón and Huancabamba rivers, the Andes become lower in elevation and drier (Josse *et al.* 2009a). The Porculla Pass in the Huancabamba Depression (6°S, 2,145 meters) defines the limit between the northern and the southern portions of the Tropical Andes. South to the department of Cajamarca in Peru, the Marañón Valley separates the Central from the Western Cordillera. The Central Cordillera is continuous but lower than the Western

Cordillera, where peaks reach higher than 6,000 meters. The Andes in this region are divided into several discontinuous massifs, the cordilleras Blanca, Huayhuash and Raura.

The Western and Central cordilleras converge near Lake Junín in central Peru. From here south to La Paz, Bolivia, the Andes are continuous and high, with no mountain pass lower than 4,000 meters. The Altiplano of southern Peru and Bolivia is an area of wide, internally drained plains containing large lake complexes. Historically, a giant lake covered the region. After several cycles of flooding and subsequent glacial periods, the giant lake fragmented into several smaller lakes (Servant and Fontes 1978, Ballivian and Risacher 1981, Argollo and Mourguiart 1995).

The southern limit of the hotspot in northern Argentina and northern Chile includes several isolated areas in a complex of cordilleras and valleys between 2,000 and 4,000 meters elevation. Here the hotspot borders the extremely arid Atacama Desert to the west and the Chaco woodlands to the east and south. South of the Chilean portion of the hotspot, temperate forests are considered a separate hotspot named Chilean Winter Rainfall and Valdivian Forests.

The Tropical Andes Hotspot encompasses the headwaters of some of the world's largest river systems, as well as important lake environments. The western slopes of the Andes drain to the Pacific and the northern slopes to the Caribbean, while the eastern Andes drain to the Amazon and Orinoco rivers (Dunne and Mertes 2007). Most of the seasonal water flow variations and water chemistry of the Amazon and its tributaries are the result of rainfall and erosion in the Andes (McClain and Naiman 2008). Scattered across the middle to high elevations of the hotspot are lakes, most formed from depressions created by mountain glaciers and filled by runoff and groundwater (Young 2011). The Altiplano of southern Peru and western Bolivia includes the world's largest high-elevation lake, Lake Titicaca (8,300 kilometers squared), famed for its unique, isolated and threatened freshwater biodiversity (Villwock 1986, Rodríguez 2001). Two large, shallow, brackish lakes, Uyuni (10,000 kilometers squared) and Coipasa (2,220 kilometers squared), occur in the southern Altiplano.

3.2 Geology

The Tropical Andes result from plate tectonic processes caused by the subduction (movement of one plate under another) of oceanic crust beneath the South American plate (Oncken *et al*. 2006). The main cause of the rise of the Andes is the compression of western rim of the South American Plate due to the subduction of the Nazca Plate. The complex arrangement of the northern Andes results from the additional action of the Caribbean Plate (Gregory-Wodzicki 2000). Different sections of the Andes began to rise at different times during the Mesozoic period (250-66 million years ago), but the high elevations of the Andes rose relatively quickly during the past 20 million years (Gregory-Wodzicki 2000, Garzione *et al.* 2008).

The hotspot has many active volcanoes, clustered in two volcanic zones separated by areas of inactivity (Stern 2004). The Northern Volcanic Zone includes numerous volcanoes from Bogota, Colombia, south through Ecuador. The Central Volcanic Zone stretches from southern Peru to northern Chile and Argentina. Volcanos in both zones show periods of recent activity, and some threaten human settlements. A 1985 eruption of the Nevado del Ruiz volcano in the Central Cordillera of Colombia buried an entire village, killing more than 23,000 people (Stern 2004).

The Andes host large ore and salt deposits along with exploitable amounts of hydrocarbons (Fontbote *et al*. 1990). The southern portion of the hotspot in Chile and Peru contains some of the largest known copper deposits in the world. The dry climate in the central and western Andes also led to the creation of extensive deposits of potassium nitrate. Yet another result of the dry climate is the salt flats of southern Altiplano, with lithium deposits that include the world's largest reserve of the element. Volcanic activity during the Mesozoic (250-66 million years ago) and Neogene (23-2.5 million years ago) in central Bolivia created the Bolivian tin belt as well as the famous, now depleted, silver deposits of Cerro Rico de Potosí.

3.3 Climate

Tropical Andean climates are noteworthy for the degree to which they vary over small spatial scales. Climate variation reflects the effects of topography; location along the western edge of the South American continent and adjacent to cold (in the south) and warm (in the north) Pacific waters; the movement of the Intertropical Convergence Zone; and easterly trade winds (Martínez *et al*. 2011, Young 2011). As is true for anywhere in the tropics, daily variation in temperature is greater than seasonal temperature variation. The trade winds drop most of their moisture on the eastern slopes of the Andes, creating a rain shadow and consequently drier conditions in the inter-Andean valleys and altiplano. North of the equator, warm Pacific water leads to humid conditions on the western Andean slope. South of the equator, the western slopes of the Andes are very dry as a result of the cold Humboldt Current running along the coast. Temperatures decline with elevation due to adiabatic cooling (caused by the decrease in air pressure with elevation), and seasonal precipitation is driven by the northward and southward movement of the Intertropical Convergence Zone. The Intertropical Convergence Zone is a band surrounding the tropical region of the globe that displaces trade winds and promotes convective thunderstorm activity. Variation in Andean climate is compounded by irregular El Niño-Southern Oscillation (ENSO) events that occur every three to seven years and alter precipitation patterns throughout the Andes (Martínez *et al*. 2011, Young 2011).

Local topography plays a large role in determining the climate of a particular area in the Andes. Deep valleys may contain all variants in climate due to elevation differences and rain shadow effects. The mildly seasonal rhythms in precipitation found at the equator become increasingly pronounced at higher latitudes in the south with a strong dry season in southern Peru and Bolivia amplified into a monsoonal air circulation system (Young 2011). This spatial and temporal variability in precipitation characterize the Tropical Andes. The western Andes in Colombia and northern Ecuador border the Chocó region, famed for receiving up to 10 meters of precipitation annually, which ranks among the wettest places on Earth. Southern Ecuador and northern Peru, in turn, are the Andean areas with the greatest shifts in precipitation due to ENSO. The heavy rains of El Niño years occur with the warm phase ENSO, which is caused by increased sea surface temperature in the tropical Pacific Ocean (Caviedes 2001). These occasional years with warm ocean temperatures bring rain to an otherwise dry environment in northwestern South America roughly every three to seven years. Species ranges fluctuate in response (Caviedes 2007), as does mountain glacier mass balance (Vuille *et al*. 2008). Additional climatic variability in the Andes occurs over decadal, centennial and millennial timescales (Ekdahl *et al*. 2008).

The most dramatic differences in species composition and ecosystem structure in the Tropical Andes result from climate gradients that are closely linked to elevation. However, the relationship between elevation and climate is complex because several factors vary with elevation. Average temperature decreases with elevation, but the daily temperature range can increase with elevation. One factor that shifts nonlinearly with elevation is frost, which becomes a relevant climate factor only above mid to high elevations. Still other climate factors are affected by both local features and geographic location. For example, the number of hours of exposure to solar radiation is determined by both slope aspect (the direction a mountain slope faces) and latitude (Young 2011 and references therein). Interaction between these local influences on climate and continental and global-scale events has set the climate stage upon which species have evolved and ecological communities have assembled.

3.4 Habitats and Ecosystems

The Tropical Andes Hotspot contains a remarkable variety vegetation types that result from the large altitudinal gradients and climatic factors caused by the interaction of the complex topography with trade winds and oceanic influences. Six major ecosystem types occur: páramo, evergreen montane forest, humid puna, dry puna, seasonally dry tropical montane forest and xerophytic scrub.

Andean páramos are insular formations dominated by tussock-forming grasses and shrublands that occur above the continuous forest line and below the permanent snowline of the highest peaks of the Northern Andes (Luteyn 1999). They often occur in very humid conditions under which vegetation and soils have developed highly efficient moisture regulating mechanisms. This characteristic makes páramos a key source of clean water for Andean cities located downstream. Páramos include an array of plant communities that harbor the most diverse mountain flora in the world (Smith and Cleef 1988) and have high levels of endemism in both species and genera (Sklenár and Ramsay 2001). Recent genetic analyses indicate that páramos may harbor the world's fastest evolving species (Hughes and Eastwood 2006, Madriñán *et al.* 2013). The species currently found in páramos have likely been heavily influenced by humans, especially through their widespread use of fire to increase productivity (White 2013). The southernmost páramos, known locally as "jalca" grasslands by some authors (Tovar *et al.* 2012), occur in the high elevations of northern Peru west of the Marañón River (Sánchez-Vega and Dillon 2005, Weigend 2002, 2004).

Evergreen montane forests cover approximately 20 percent of the hotspot, occupying a wide altitudinal range (~500–3,500 meters) along both parts of the western and most of the eastern slopes of the Tropical Andes. Because of the steep slopes of these mountains, it is possible to find altitudinal gradients of 3,000 to 4,000 thousand meters in a horizontal distance of only 50–100 kilometers. This forest type also covers the Cordillera de la Costa in northern Venezuela and the Sierra Nevada de Santa Marta in Colombia, two outlying mountain ranges that are part of the hotspot. Along the eastern slopes of the Andes two rather distinct ecological subdivisions occur within the evergreen montane forest: the sub-Andean belt below 2,000 meters of elevation and the cordilleran belt proper, which runs from 2,000 meters up to the treeline. This distinction is associated with a discontinuous sub-Andean mountain system that includes much older geologic formations, some including sandstone substrates, which harbor unique plant communities. The soils in the cordilleran belt are much younger due to the recent uplift of the high Andes.

Seasonally dry montane forest and *xerophytic scrub* are restricted to the middle and lower portions of the inter-Andean valleys, following the courses of major rivers such as the Guayllabamba, Marañón and Apurimac, and smaller deep gorges and valleys throughout the region. These areas have a pronounced water deficit due to the rain shadow effect. Further south, in Bolivia and northern Argentina, seasonally dry forests also occur in inter-Andean valleys, but in these higher latitudes, water deficit is more often the result of climatic seasonality than a consequence of a rain shadow. The western slope of the Andes adjacent to the Sechura desert in Peru also holds remnants of dry seasonal forest in the north that grade into xerophytic scrub toward the Chilean border.

Humid puna occurs from northern Peru to the central portion of the eastern cordillera in Bolivia, including the high-Andean basin of Lake Titicaca. This almost flat basin filled with water several times during the Holocene (11,700 years ago to the present), and now contains soils characterized by lake and glacial sediments. The humid puna is a grassland ecosystem type that covers a wide elevational range, from 2,000 to 6,000 meters, and is roughly as extensive as evergreen montane forests within the hotspot. Some areas of puna contain remnants of forest dominated by trees in the genus *Polylepis*. Significant portions of the moist puna were probably once covered by *Polylepis* forests, but ancestral land uses by the human settlers of this landscape have significantly reduced these forests, replacing them with grasslands and scrub (Josse *et al*. 2009). In the topographic depressions of the wet puna, as well as surrounding lakes and other water courses, there are numerous and sometimes large wetlands and peat bogs.

The *dry puna*, another Andean grassland and herbaceous ecosystem type, is characterized by reduced precipitation and occurs in the central-southern portion of western Bolivia, northwestern Argentina, and adjacent areas of southwestern Peru and northeastern Chile. The dry puna is extensive, representing about 15 percent of the hotspot area, with an elevational range from 2,000 meters in the eastern valleys (where it is known as dry pre-puna) up to 6,000 meters on the high peaks of the western cordillera. Vegetation of the dry puna is highly diversified and forms several unique systems.

In addition to these major ecosystems, a number of transition zones to ecosystems outside of the hotspot further contribute to its diversity of habitats and species. The lower elevations of the northwestern Tropical Andes are dominated by evergreen montane forest that transitions to lowland wet forest in the Chocó-Tumbes region. Similarly, most of the eastern border of the hotspot transitions to the lowland wet forest of the Amazon Basin. Parts of the northern edge of the hotspot in Colombia and Venezuela transition to Caribbean dry forest. The southern portion of the hotspot in Chile and Argentina transitions to montane grasslands and steppe, whereas the southwestern border transitions to the dry Atacama Desert in southern Peru and northern Chile. Further south, the Atacama Desert gives way to temperate rainforests and the Chilean Winter Rainfall and Valdivian Forests Hotspot.

The Huancabamba Depression in northern Peru creates a natural dispersal barrier between the northern and the central Andes. The composition of faunal communities differs strikingly across this short distance (Duellman 1979, 1999; Duellman and Wild 1993). For plants, the area surrounding the Huancabamba Depression is one of especially high diversity with endemic species and even genera (Weigend 2002, 2004). This region is also considered the transitional floristic zone between the northern and southern Tropical Andes (Simpson and Todzia 1990, Gentry 1982).

3.4 Species Diversity, Endemism and Global Threat Status

The Tropical Andes Hotspot is the most diverse hotspot currently recognized, with a greater total of species and a greater total of endemic species than anywhere else on Earth (Mittermeier *et al*. 2011). Although the origins of Andean and adjacent Amazonian diversity are incompletely understood despite decades of research (Haffner 1969, Endler 1982, Fjeldså *et al*. 1999, Rahbek and Graves 2001), the rich flora and fauna is a function of the long isolation of South America from other continents during most of the Cenozoic Era (65 million years ago to the present), the faunal and floral interchange between North and South America that took place in the last few million years, and the formation of the Andes massif itself. The relatively recent uplift of the highest peaks of the Andes during the last 5 million years (Garzione *et al*. 2008) has caused rapid recent diversification (Hughes and Eastwood 2006).

Several studies focusing on Andean biogeography (*e.g*., Roy *et al*. 1997; García-Moreno *et al*. 1999) suggest that montane biota are the product of a combination of two important factors: (a) geological events with local to regional impacts on community structure and ecological processes, and (b) paleoclimate history. Alternating glacial and interglacial periods over the past 2.5 million years resulted in climate zones shifting up and down slope, leading to changes in isolation and connectivity that created ideal conditions for speciation events in diverse groups of organisms (Hooghiemstra and Van Der Hammen 2004, Ribas *et al*. 2007).

The varied climates found in the Andes today also play a major role in explaining high biodiversity in the Andes. Species diversity increases with annual precipitation (Kalin Arroyo *et al*. 1988, Rahbek and Graves 2001, Pyron and Weins 2013), helping to explain high diversity on the predominantly wet eastern slopes of the Andes and in the very humid Chocó region of western Colombia and Ecuador. The variation of climates spatially also promotes beta diversity (species turnover across geography) due to specialization of floras and faunas to particular climates. Thus a diverse cactus flora can occur in dry valleys just a few kilometers away from Yungas cloud forests where tree ferns, *Brunellia* trees, and ericaceous shrubs flourish (Beck *et al.* 2007). Stable conditions in climate refugia can also be important to maintain diversity of endemic species (Fjeldså *et al*. 1999, Graham *et al*. 2006).

The extraordinarily high species richness and endemism has led the Tropical Andes to be identified as a regionally and globally outstanding biodiversity area (Myers *et al*. 2000, Rahbek and Graves 2001). Considering just vertebrates and vascular plants, the hotspot contains more than 34,000 species (Mittermeier *et al*. 2011; Table 3.1). Nearly half of the species are endemic to the hotspot.

Table 3.1. Species Diversity, Endemism and Global Threat Status in the Tropical Andes Hotspot

Taxonomic Group	Species	Endemic Species	Percent Endemism	Threatened Species
Plants	~30,000	~15,000	50.0	Not assessed
Fishes	380	131	34.5	7 (incomplete)
Amphibians	981	673	68.6	503
Reptiles	610	275	45.1	19 (incomplete)
Birds	1,724	579	33.6	203
Mammals	570	75	13.2	82
Total	~34,265	~16,733	~48.8	814

Plants

The Tropical Andes is home to an estimated 30,000 species of vascular plants, accounting for about 10 percent of the world's species and surpassing the diversity of any other hotspot (Kreft and Jetz 2007, Mittermeier et al. 2011). It is also the world leader in plant endemism, with an estimated 50 percent (and perhaps 60 percent or more) of these species found nowhere else on Earth. This means that nearly seven percent of the world's vascular plants are endemic to the 0.8 percent of the earth's land area represented by this hotspot.

Research over the last several decades has revealed several patterns of Andean plant diversity and endemism. The forests of the Tropical Andes are floristically different from their lowland counterparts in that they contain significant representation of Laurasian (the former supercontinent made up of present-day North America and Eurasia that existed from approximately 300 to 100 million years ago) plant families and genera that are absent or rare in the lowlands. These groups have presumably dispersed to the Andes since the closing of the Central American isthmus. Examples are the oaks *(Fagaceae)* in Colombia, the Ericaceae (heath family), and the *Lauraceae* (avocado family). In general, diversity decreases with elevation (within the hotspot, *i.e*., above 1,000 meters) whereas endemism often increases with elevation (Kessler 2001, Knapp 2002, Young *et al*. 2002, Krömer *et al*. 2005).

Investigation into the global threat status of Andean plants is only beginning. So far no group of Andean plants has been comprehensively assessed by the IUCN and published on the IUCN Red List of Threatened Species. Both coniferous trees and cacti have threat categories assigned to species, but distribution maps for these species have not been published, making it difficult to identify which species occur within the hotspot. Red Lists have been published at the national level for some families or national endemic species (León *et al.* 2007, León-Yánez *et al.* 2011, MMAYA 2012). These analyses, which have not been reviewed by the IUCN, nevertheless provide a preliminary indication of the threat status of Andean plants. Like most of the vertebrate groups, threatened plants are those with small ranges that are threatened with habitat destruction. For plants, however, high-elevation species restricted to isolated páramos in the northern Tropical Andes are particularly threatened (as opposed to vertebrates, where threatened species are concentrated at lower elevations). The narrow ranges of these species and ongoing threats of habitat conversion have led to this result.

Fishes

More than 375 species of freshwater fishes are documented in the hotspot, a relatively small number compared to the striking diversity of lowland Amazonian drainages and several other hotspots (Ortega and Hidalgo 2008, Mittermeier et al. 2011, Barriga 2012). Fish habitats include high elevation lakes (Peru alone has 10,000 such lakes) and small to medium-sized rivers, with diversity falling sharply with elevation. In Ecuador, for example, only one fish species (*Grundulus quitoensis*, a relative of the tetras) occurs above 2,800 meters (Barriga 2012). The Andean fish fauna is restricted to species highly adapted to cold lakes and cold, highly oxygenated, fast-flowing streams (Reis 2013). These species tend not to occur in lower elevation, warmer waters (Ortega *et al.* 2011). One group of coldwater fishes are in the pupfish genus *Orestias*, which is represented by more than 40 species in Lake Titicaca and nearby drainages. All but a few of the 90 species of naked sucker-mouth catfishes in the family Astroblepidae are also endemic to the Tropical Andes. These remarkable animals can use their sucker-like mouths and modified pelvic fins to climb waterfalls in fast-flowing mountain streams. The pencil catfish (genus *Trichomycterus*) are an Andean group that are typically restricted to a single drainage and may be the only fish species that can live in their high-elevation habitats (Ortega *et al.* 2011).

Only 18 species of Andean freshwater fishes have been assessed for their conservation status by the IUCN. This small sample precludes any estimate of the overall threat status of Andean fishes. An assessment workshop for some Andean watersheds was held in April 2014 with the results due out in 2015. National Red Listing efforts of freshwater fishes have taken place in Venezuela (Rodríguez and Rojas-Suárez 2008), Colombia (Mojica *et al*. 2002) and Bolivia (MMAYA 2009). None of these reports separate Andean species as a group. However, 20 species of pupfish are threatened in Bolivia by overfishing, introduced species and habitat modification. Three pencil catfish are also threatened in that country due to water pollution. In Colombia, a small catfish (*Rhizosomichthys totae*) endemic to Lake Tota in the Eastern Cordillera went extinct in the last century, presumably due to the introduction of rainbow trout (*Onchorhynchus mykiss*; Mojica *et al*. 2002).

Amphibians

The Andes is by far the most diverse region in the world for amphibians, with approximately 980 species and more than 670 endemics. These numbers are almost double those of the next most diverse hotspots for this group, Mesoamerica and the Atlantic Forest in Brazil. Like reptiles, amphibians are more diverse in the lowlands, especially humid forests. In the Andes, the amphibian fauna is largely restricted to frogs and toads. Eleven genera are endemic to the Andes (Duellman 1999). Salamanders are rare, with only two species occurring in the Andes south of Ecuador. Caecilians are nearly as scarce in the Andes, although one species, *Epicrionops bicolor*, occurs as high as 2,000 meters elevation in Colombia. Eight amphibian genera are endemic to the Andes (IUCN 2013). The most diverse of these is the frog genus *Telmatobius*, with about 45 species. Other frog and toad groups, such as the rain frogs, family Leptodactylidae, have hundreds of species that occur primarily in the lower elevation evergreen forests of the Andes.

Some well-known amphibians from the Tropical Andes include the marsupial frogs of the genus *Gastrotheca*, in which the females of some species carry their eggs in pouches on their backs. The harlequin toads, genus *Atelopus*, are a diverse and brightly colored group that inhabits streams and wetlands in the Andes south to Bolivia. Some members of the poison dart frog family (Dendrobatidae) also occur in the Andes. One, *Epipedobates tricolor*, produces a compound more powerful than morphine that may serve as the source of new medicines. The

Titicaca water frog (*Telmatobius culeus*) is an aquatic frog with deeply folded skin that is harvested commercially in Lake Titicaca for its value as a protein source for local communities.

Amphibians represent more than half of all threatened species in the Tropical Andes Hotspot (Table 3.1). Amphibians tend to have smaller ranges than other vertebrates, causing them to be more likely to fall under the Red List extent of occurrence thresholds for threatened categories (Stuart *et al.* 2004). Although amphibians in the Tropical Andes are threatened by habitat destruction just as other species, they are additionally threatened by incompletely understood factors that include disease and climate change (Stuart *et al.* 2004).

Reptiles

There are more than 600 reptile species identified in the Tropical Andes Hotspot (more than 270 of which are endemic) and three endemic genera. Only the Mesoamerican Hotspot has more species. Reptile diversity worldwide is inversely related to temperature (McCain 2010), and the Andes are no exception. Most of the reptile diversity in the Andes is concentrated on the lower slopes. High elevation ecosystems harbor low-diversity reptile communities, although the species that do occur there are more likely to be endemic to small areas.

With charismatic reptiles such as caiman, turtles and anacondas largely restricted to the lowlands, the Andes are characterized by mostly small-bodied lizards and snakes. The diverse lizard genus *Anolis* contains numerous species in Andean cloud forests. *Anolis* reaches the southern extent of its range in Bolivia. *Liolaemus* lizards are characteristic of puna grasslands, dry scrub and rocky hillsides of the southern Tropical Andes. One species, *Liolaemus montanus*, inhabits localities in the Andes higher than any other vertebrate: a population is reported from 5,176 meters elevation in the Cordillera Real in Bolivia (Aparicio and Ocampo 2010). Most Andean snakes are harmless, although a few poisonous snakes occur. For example, the Andean lancehead viper (*Bothrocophias andianus*) is endemic to high elevation evergreen forest in Bolivia and Peru.

Reptiles have yet to be comprehensively assessed by the IUCN. The species currently on the list were included in a random subset of species that were evaluated as part of a sampled Red List assessment of reptiles worldwide (Böhm *et al.* 2013). Thus roughly 84 percent of Tropical Andean reptiles remain to be assessed. Of the assessed species, 19 are globally threatened, 12 of which are endemic to the hotspot with range sizes of less than 14,000 kilometers squared. Although Ecuador covers only a small portion of the hotspot, 11 of the 19 threatened reptiles are distributed in this country. Whether Ecuadorian reptiles are truly more threatened than elsewhere in the Tropical Andes will be determined once the remaining species are assessed.

Birds

With more than 1,700 species found in the hotspot, a third of them endemic, birds are the most species-rich vertebrate group in the hotspot and represent another group for which diversity is greater in the Tropical Andes than in any other hotspot. Despite centuries of study, new bird species are continually being found in the Andes as new areas are explored and new genetic techniques improve our understanding of species limits (*e.g.,* Cuervo *et al.* 2005). No family is endemic to the Andes, but groups such as hummingbirds *(Trochilidae),* New World flycatchers *(Tyrannidae),* and tanagers *(Thraupidae)* are very diverse. Diversity stems both from rapid speciation within the Andes and repeated colonization from older lowland lineages (Fjeldså and Rahbek 2006). Several closely related species groups (*e.g.,* the genera *Catharus*, *Basileuterus* and *Tangara*) exhibit patterns of species replacement across elevational gradients. As a result of the hotspot's unique bird diversity, 284 Important Bird Areas have been thus far designated in the region.

Characteristic birds of the Andes include the Andean cock-of-the-rock (*Rupicola peruvianus*) with its brilliant coloration and exaggerated courtship displays along mountain streams. Andean condors (*Vultur gryphus*) soaring over the high Andes is a stirring sight. The species has been the subject of intensive reintroduction campaigns in the northern Tropical Andes, and is used by indigenous peoples to symbolize their conflict with Spanish conquistadors (symbolized by bulls).

Twelve percent of the Tropical Andean avifauna is threatened with extinction, about the same rate as for birds globally. A number of threatened species in the Tropical Andes, such as cracids, hawks, and falcons occur in both Andean and adjacent lowland habitats outside of the hotspot. In fact, just 39 percent of the 203 threatened species occurring in the hotspot are completely endemic to the hotspot. Thus most of the birds endemic to the hotspot are not globally threatened. Many endemic species are distributed along narrow elevational bands, especially on the eastern slope of the Andes. Many species occur within these small elevation ranges all the way from Venezuela to Bolivia. The large range and numerous populations of these species serve to buffer them from threats that operate on more local levels, resulting in a lower proportion of globally threatened species than might be expected by the large number of endemics.

Mammals

The 570 mammal species in the Tropical Andes Hotspot represent over 10 percent of the global diversity of this group. No other hotspot has a greater diversity of mammals. The majority of the species, as elsewhere in the tropics, are rodents and bats. Rodents occur in all Andean habitats and are especially diverse in evergreen montane forests, where several genera exhibit high levels of endemism. Andean bats are most diverse at lower Andean elevations, with diversity declining precipitously above treeline. The large mammals of the Andes are remnants of a much more diverse megafaunal community that became extinct with the arrival of humans on the continent (Burney and Flannery 2005). Among them, guanacos (*Lama guanacoe*) and vicugnas (*Vicugna vicugna*) are iconic ungulates that persist in the southern Tropical Andes. Other large mammals, such as the mountain tapir (*Tapirus pinchaque*) and spectacled bear (*Tremarctos ornatus*), are rarely seen due to their scarcity, dense habitats, and elusive behavior.

An important mammalian flagship species for the Tropical Andes is the yellow-tailed woolly monkey (*Oreonax flavicauda*), which was believed to be extinct until it was rediscovered in 1974. It is the largest mammal endemic to Peru, and is only one of three primate genera in the Neotropics to be endemic to a single country. Its distribution is restricted to a small area of cloud forest in the northern Peruvian departments of Amazonas and San Martín. This monkey is one of 82 threatened mammals in the hotspot. The proportion of mammals in the hotspot that are threatened (14 percent) is lower than the global average (20 percent; Schipper *et al*. 2008). Mammals in the Tropical Andes are threatened by habitat destruction, as they are elsewhere. An important threat to mammals in other parts of the world, persecution as a source of bushmeat or traditional medicines, is less of a threat in the Tropical Andes and is one reason for the relatively healthier global threat status.

3.5 Importance of Ecosystem Services

The ecosystems of the Tropical Andes Hotspot have supported human habitation for the last 13,000-19,000 years (Fuselli *et al.* 2003). Beginning at about 500 B.C., large human settlements arose in the Central and Northern Andes and reached advanced forms of social and political organization (*i.e*., Chavin, Moche, Tiwanaku, Cañari, Muisca and Incan). All eventually collapsed or were subsumed in the most important civilization of the region, the short-lived Empire of the Incas that emerged around 1400 A.D. These cultures contributed to the domestication of numerous species, turning this region into one of the world's 12 major centers of origin for plants cultivated for food, medicine, and industry (Saavedra and Freese 1986).

Currently the area has a human population of over 57 million that depends to a large extent on the goods and services from the region's ecosystems. Numerous cities, including ten with populations greater than 500,000 and four of which are national capitals, are located within the hotspot (Venezuela: Caracas; Colombia: Bogota, Bucaramanga, Cali, Ibague, Medellin; Ecuador: Quito; Peru: none; Bolivia: La Paz and Cochabamba; Argentina: San Miguel de Tucuman; Chile: none). In addition, inhabitants of cities located hundreds or even thousands of kilometers distant from the Topical Andes nevertheless benefit directly from services such as water provisioning provided by the hotspot, including Lima and Guayaquil.

Ecosystem services are defined as the benefits people obtain from ecosystems, and can be divided into four categories: *provisioning services* (*e.g*., water, food), *regulating services* (*e.g*., climate regulation, flood control), *supporting services* (*e.g*., soil formation, nutrient cycling) and *cultural services* (*e.g*., recreational, religious, spiritual values) (Millenium Ecosystem Assessment 2005). The Tropical Andes provides abundant ecosystem services in all of these categories (Table 3.2).

Among the provisioning services, water is one of the most abundant and important, providing potable water and energy production. The hotspot can be considered as South America's water towers. Streams originating in high elevation páramos, punas and montane forests, as well as Andean glaciers, supply water to cities and villages in the hotspot and throughout the extensive downstream drainages of these basins in northern and western South America. Andean rivers provide most irrigation water for the region's croplands and for the hydropower plants that generate about half of the region's electricity (Bradley *et al*. 2006). The Tropical Andes is the source of the main stem of the Amazon and Orinoco Rivers, the largest and third-largest rivers in the world measured by discharge. Dozens of other major rivers drain the Tropical Andes on the Pacific and Caribbean slopes of the hotspot. Other provisioning services are food such as fish (especially from the large altiplano lakes in Peru and Bolivia), fruits, seeds and other plant products extracted from natural ecosystems; wild relatives of crop plants that offer genetic variation for deriving new varieties; medicinal plants and animals; pasturage of livestock in non-forest ecosystems, especially punas; firewood; and timber.

Water flow control is a valuable provisioning service. Andean wetlands act to regulate flow from highly seasonal precipitation, providing water even in periods of little rainfall (Anderson *et al.* 2011). The Andes store significant amounts of carbon, ranging from less than 50 metric tonnes per hectare in grassland systems to 250 metric tonnes per hectare in lower montane forests (Saatchi *et al*. 2011). Natural ecosystems also help retain soil, to help in maintaining soil fertility for agriculture and to prevent landslides on steep slopes during periods of high rainfall. These ecosystems also help regulate climates by forming critical components of the water cycle and limiting the degree to which solar radiation heats the air. In cloud forests, trees intercept cloud-borne mist, which condenses and runs off into streams and rivers.

Supporting services of the Tropical Andes include pollination of crops and soil formation. Native pollinators are essential for the pollination of Andean crops such as coffee, potato, tomato, *lulo* (*Solanum quitoense*; used for fruit drinks principally in Colombia and Ecuador, and also known as naranjilla), *chocho* or *tarwi* (*Lupinus mutabilis*), *capulí* (*Prunus salicifolia*) and passion fruit (Pantoja *et al*. 2004). Soils and rivers contribute to human waste disposal. Non-monetized cultural services are provided by the extraordinary biodiversity and scenery. The scenic value in turn supports a thriving ecotourism industry that provides income at local, national, and international levels (see Chapter 5). As discussed in Chapter 4, the hotspot also has an important role to play in carbon storage to regulate the global caron budget and buffer against climate change.

Table 3.2. Ecosystem Services Provided by the Tropical Andes Hotspot

Service	Beneficiaries	Relative Importance
Provisioning		
Water (drinking, irrigation, navigation, industrial use, energy generation)	All residents of the hotspot and downstream drainages	Highly significant in hotspot and throughout drainages in northern and central South America including the Orinoco and Amazon River Basins
Food (bushmeat, wild plants)	Rural and indigenous communities and some urban areas	Locally important especially for indigenous groups
Crop wild relatives	All humankind	Globally significant
Medicinal plants and animals	Rural and indigenous communities and some urban areas	Locally important throughout hotspot
Pasturage	Rural communities and the national and international consumers of meat and textiles produced	Significant in higher elevation grassland ecosystems throughout hotspot
Firewood	Rural and indigenous communities	Locally important throughout forested areas of hotspot
Timber	Rural communities	Locally important throughout forested areas of hotspot
Regulating		
Sediment retention	All communities and cities within hotspot	Significant throughout hotspot
Down-slope safety	Most communities and cities within hotspot	Significant throughout hotspot
Carbon storage	All humankind	Globally significant
Climate regulation	All residents of the hotspot	Significant throughout hotspot

Supporting		
Photosynthesis, pollination, soil formation	All residents of the hotspot	Significant throughout hotspot
Waste disposal	All residents of the hotspot and downstream drainages	Significant in hotspot and throughout drainages
Cultural		
Ecotourism opportunities	Local, national, and international tour operators and tourism infrastructure support staff	Locally important throughout hotspot
Scenic beauty and spiritual value	All humankind	Globally significant

4. CONSERVATION OUTCOMES DEFINED FOR THE HOTSPOT

To support effective conservation action, CEPF defines conservation outcomes for its investment: the species, sites and corridors where conservation action must be focused to minimize extinction. KBAs are identified as places that support threatened species; *i.e*., those known to be threatened with extinction or having a severely restricted range of occurrence. KBAs are delineated to secure ecological processes that are required for species survival. Landscape corridors are also identified to link KBAs, secure needed landscape connectivity, and maintain ecosystem function and services for long-term species survival. By identifying and prioritizing KBAs as the primary focus for conservation, the success of conservation investments can be measured. Given threats to biodiversity across the Tropical Andes, quantifiable measures for conservation can be in terms of "extinctions avoided" (species outcomes), "areas protected" (KBA outcomes), and "corridors created" (corridor outcomes). These conservation outcomes allow the limited resources available for conservation to be targeted more effectively, and their impacts to be monitored at the global scale.

Conservation outcomes were defined through a sequential process of species selection, distribution mapping and KBA and corridor design. The process, following standard methodology (Langhammer *et al*. 2007), requires data on the global threat status of species, the distribution of globally threatened and range-restricted species, and how threats are distributed throughout the hotspot. These data, however, were not always available for the hotspot. For the Tropical Andes, global threat status has been assessed comprehensively for mammals, birds and amphibians. Some reptiles have been assessed but many gaps remain. Also, while the distributions of many taxa in the Tropical Andes are roughly known, their mapped presence varies from confirmed field observations to estimated boundaries of their range. Conservation outcomes were therefore defined using best-available distribution data for mammals, birds and amphibians, followed by expert review and validation procedures involving confirmation of species presence in the area through point locality data. Because the hotspot lacks a complete assessment on threatened reptiles and plants, the profile incorporates data on threatened reptiles and plants where available.

4.1 Species Outcomes

The species most likely to become extinct are either documented as being *threatened* with extinction or having a *restricted range* where a localized threat could have a rapid and broad impact on their population. Widespread and common species are not an independent focus because their distributions overlap with areas identified for globally threatened and restricted-range species.

The metric used to identify threatened species is the IUCN Red List of Threatened Species (IUCN 2013). Species listed in one of the three threatened categories—Vulnerable, Endangered or Critically Endangered—are considered threatened. Species categorized as Data Deficient are excluded because they are priorities for further research but not yet priorities for conservation action *per se* because further research may reveal that some of these species are not globally threatened. Also excluded are species known to be extinct or extinct in the wild, or those considered to be threatened locally (via a national process separate from the IUCN Red Listing process) but not globally. These locally threatened species may be national or regional conservation priorities but not global priorities. The species listings used for the Tropical Andes were current as of October 2013. Species outcomes are defined for all globally threatened species, regardless of whether they require species-focused conservation action or not. For most threatened species, the main conservation need is adequate habitat protection, which can be addressed through conservation of the sites at which they occur. However, some threatened species could require different types of actions in order to avert their extinction, such as translocations, captive breeding, controls on wildlife trade, or biosecurity to prevent spread of pathogens.

Range-restricted species were identified based on their range size. A 50,000-km^2 threshold of total species range was used for inclusion of species that either were not categorized as threatened by the IUCN Red List or were never assessed by the IUCN. Species that co-occur in large congregations during critical components of their lifecycle (*e.g.*, migratory bird stopover congregations) were also included.

Although numerous plants are threatened or range restricted in the Andes, it was not possible to include them comprehensively in the analysis because of a lack of IUCN plant assessments and other mapped distribution information to identify range-restricted species. While the world's herbaria have made enormous progress collecting and documenting plant species throughout the Andes, only two groups, the cactus and the gymnosperms (plants that reproduce by means of exposed seeds, such as conifers), have been comprehensively assessed for IUCN status. However, digital distribution maps are not yet publicly available for either group, rendering them unusable for the analysis. Some plants that are endemic to specific countries have been assessed in national Red List efforts using the IUCN criteria (León *et al.* 2007, León-Yánez *et al.* 2011, MMAYA 2012). In theory, species that are endemic to a country should have the same Red List category whether assessed at either the national or global level, and thus these species were included in the analysis where possible. However digital datasets with distribution information from these projects are not yet publicly available. Therefore the only plant data from the national Red List publications that could be included were for species for which locality data were available, either as point localities or as digital distribution maps that have been independently published (Beck *et al.* 2007, Josse *et al.* 2013).[1] Criteria for species selection are summarized in Table 4.1 (Langhammer *et al*. 2007).

[1] Groups for which plant data were available were for members of the families Acanthaceae, Aquifoliaceae, Bruneliacea, Campanulaceae, Cyathaceae, Ericaceae, Fabaceae (*Inga* only), Loasaceae, Malpighiaceae, Onagraceae (*Fuchsia* only), and Passifloraceae. These plant data were restricted to the east slope of the Andes in Peru and Bolivia except for the Passifloraceae family, for which data were available for all of Andean Ecuador, Peru and Bolivia.

Table 4.1. Criteria for Species Selection for KBA Delineation in the Tropical Andes Hotspot

Criterion	Sub-criteria	Data Limitations
Extinction Risk Globally threatened status	IUCN Red List status: a) Critically Endangered (CR) b) Endangered (EN) c) Vulnerable (VU)	Comprehensive IUCN Red List status available only for mammals, birds and amphibians. IUCN Red List status available for a random subset of reptiles. Plant status available only from national Red Lists in Ecuador, Peru and Bolivia (León *et al.* 2007, León-Yánez *et al.* 2011, MMAYA 2012) and for which digital distribution maps were available (Beck *et al.* 2007, Josse *et al.* 2013). Distribution data include confirmed field observations and range maps.
Range Restriction Characteristics of a species' global range	a) Restricted-range species Mammal, bird, amphibian, reptiles and plant species with a mapped global range less than 50,000 km^2.	
	b) Globally significant congregations Habitat locations responsible for maintaining 1% of global population for multiple congregating species (from designated Important Bird Areas).	

As of October 2013, the IUCN Red List included 814 species assessed in one of the threatened categories in the hotspot (Table 4.2, Appendix 4). Eight-seven plant species that have been assessed as threatened in a national Red List effort and for which a digital distribution map was available, but these species are not added to the CEPF conservation outcomes as they are not on the IUCN Global Red List.[2] The total number of threatened species at 814 is the largest such number of all the hotspots, but is a substantial underestimate of the true number of threatened species in the Andes. Major, species-rich groups such as most plants and invertebrates, as well as freshwater fishes and most reptiles, have yet to be assessed for conservation status. The same processes that led to high diversity, small ranges, and threats in the assessed species have undoubtedly led to roughly corresponding levels of threatened species in the unassessed groups. Although efforts to digitize ranges of Andean species have taken place only since about 2000, data for the ecosystem profile were available for 1,314 species with restricted ranges that are not also threatened (Table 4.2).

[2] National Red Lists have been completed for endemic plants in Ecuador, Peru and Bolivia, and use the IUCN Red List criteria for assigning threat categories. However, these assessments are published locally, not by the IUCN, and will not appear on the IUCN Red List.

Table 4.2. Summary of Globally Threatened and Restricted Range Species in the Tropical Andes Hotspot

Taxonomic Group	Critically Endangered	Endangered	Vulnerable	Total	Restricted Range
Plants[1]	0	0	0	0	324
Fish[1]	2	0	5	7	--
Amphibians	133	207	163	503	567
Reptiles[1]	2	5	12	19	38
Birds	18	75	110	203	257
Mammals	10	18	54	82	127
Total	**165**	**305**	**344**	**814**	**1,313**
Percentage	*19*	*35*	*38*	*100*	--

[1] The IUCN has not yet comprehensively assessed fish, reptiles or plants in the Tropical Andes Hotspot.

Plants

Digital range information was available only for selected plant groups for Ecuador, Peru and Bolivia. These groups span a range of plant forms, including vines and lianas (*e.g.*, Passifloraceae), shrubs (Acanthaceae, *Mimosa*), trees (Brunelliacea), and hemiepiphytes (Marcgraviaceae). They also range in moisture preference from those inhabiting moist cloud forests (*e.g.*, Campanulaceae) to others occurring in dry valleys (Malpighiaceae). Of these, 87 had been listed as threatened in a national Red List effort, but not assessed by IUCN for the Global Red List.   An additional 324 met the criterion for having restricted ranges. The primary criterion for which plants were included in Red Lists was small and declining range size due to habitat destruction (León *et al.* 2007, León-Yánez *et al.* 2011, MMAYA 2012). Numerous species are known from single collecting localities, such as *Justicia tarapotensis*, collected in San Martín Department, Peru, originally by the famed English botanist Richard Spruce, who traversed the Andes and the Amazon in the mid-19th century.

Plant families are known to differ in regard to where they reach peaks of endemism, both in terms of elevation and precipitation regime (Beck *et al.* 2007). Thus plants complement vertebrate groups that tend to have centers of endemism at restricted elevational ranges in the Andes (Young 2007). For example, species of the herb and shrub family Acanthaceae are most diverse at 1,000 meters elevation on the eastern slope of the Andes, whereas members of the heath family (Ericaceae) are most diverse at 2,600 meters elevation (Beck *et al.* 2007).

Unfortunately, digital range and conservation status information are not available for the characteristic plants of the páramos. These plants are well known to be restricted to isolated páramos, and many species will no doubt be listed in a threatened category once the IUCN can assess them. Until then, páramos will be undervalued in quantitative analyses of conservation priorities in the northern Andes. Similarly, assessments of the grassland species of the central Andean puna, and high elevation plants such as cushion plants, will bring more attention to the conservation needs of those habitats. For these reasons, expert validation of KBAs was important to compensate for these data gaps.

Freshwater Fish

Only 18 species of fish that occur in the hotspot have been assessed by the IUCN. Seven are threatened, including two Critically Endangered species. The Critically Endangered Andean catfish (*Astroblepus ubidiai*) is restricted to isolated springs in Imbabura, Ecuador. The species is threatened by habitat deterioration caused by pollution and cattle grazing. The other Critically Endangered species, a pencil catfish (*Trichomycterus venulosus*) from Colombia, may be extinct as it has not been recorded since 1911. Causes of declines in the other threatened species include pollution and introduced trout. Efforts to assess freshwater species for possible inclusion on the Red List were in progress when this ecosystem profile was being prepared, allowing for a more complete representation of freshwater species in future KBA exercises.

Amphibians

Amphibians are the most threatened group of organisms assessed to date in the Tropical Andes (Table 4.2). A staggering 14 percent of all amphibian species in the hotspot are Critically Endangered with extinction. Two groups of amphibians face very high levels of imperilment. The strikingly colored harlequin frogs (genus *Atelopus*) have suffered significant and widespread declines across their range in the Andes from Venezuela to Bolivia (La Marca *et al.* 2005). For example, only one of the nine described species of the genus from Venezuela is known to have an extant population (Molina *et al.* 2009). Similarly, *A. ignescens*, once a locally abundant species in highland habitats in Ecuador, is now feared extinct (Ron *et al.* 2003). The reasons cited for these declines, which took place even in seemingly pristine habitats, are the fungal disease chytridiomycosis and climate change, possibly in concert (Lampo *et al.* 2006, Pounds *et al.* 2006). Chytridiomycosis was first discovered in the 1990s and has since been linked with large-scale amphibian die-offs and extinctions that have been particularly severe in montane, stream-dwelling species in Latin America over the past 40 years.

Another example is the genus *Telmatobius*, aquatic frogs including the aforementioned Titicaca water frog that was once so abundant it was harvested in nets for food. The genus, which occurs from Ecuador to Chile, includes 58 species, only one of which is still common enough to classify as Least Concern (IUCN 2013). The remaining species are all either threatened or Data Deficient and many are possibly extinct. Chytridiomycosis is also implicated in the catastrophic decline of this diverse genus (Merino-Viteri *et al.* 2005, Barrionuevo and Mangione 2006).

Reptiles

Although Andean reptiles have not yet been comprehensively assessed by the IUCN (Red List assessments were being undertaken when this ecosystem profile was under preparation), data for the random sample of species that were assessed indicate the factors threatening these species. Most threatened reptiles are restricted to forest habitats and have small ranges that are declining due to habitat destruction (IUCN 2013). The causes of habitat destruction are typically logging and expanding agriculture (*e.g.*, the lizard *Stenocercus crassicaudatus*, which occurs near Cuzco, Peru, and the Ecuadorian snake *Atractus roulei*). Also, mining operations threaten the habitat of species such as the Ecuadorian lizard *Riama balneator*. Finally, species such as the Venezuelan lizard *Liophis williamsi* inhabiting the leaf litter of cloud forests are additionally threatened by climate change that is lowering humidity below required levels.

Birds

Threatened birds in the Tropical Andes share many characteristics with threatened reptiles. Most threatened species have small ranges and are dependent on forests or other natural habitats that are being destroyed and fragmented by logging, agricultural expansion and mining. An additional threat is the draining of marshes and other wetlands. Threatened species include rails, hummingbirds, antpittas, tapaculos, flycatchers, wrens and flowerpiercers, among others (BirdLife International 2013, IUCN 2013).

Besides the little-known (and sometimes recently described) interior forest birds, a few charismatic species are threatened. The spectacular red-fronted macaw (*Ara rubrogenys*) is restricted to dry valleys in Bolivia and is threatened by habitat destruction as well as by persecution as crop pests and trapping for the local and international pet trade (IUCN 2013). Other noteworthy threatened species are the boldly colored scarlet-banded barbet (*Capito wallacei*), from the vicinity of the Cordillera Azul in Peru, that was not described until 2000 (O'Neil *et al.* 2000), and the enigmatic long-whiskered owlet (*Xenoglaux loweryi*), found near Abra Patricia in northern Peru (IUCN 2013).

Mammals

Most threatened mammals occurring in the Tropical Andes Hotspot are rodents or bats. The populations of these species are declining due to many of the same reasons as other species: logging and expanding agriculture (IUCN 2013). One semiaquatic species, the fish-eating rat *Anotomys leander*, is threatened in Ecuador by oil spills in Papallacta Lake (IUCN 2013). As with birds, 70 percent of the threatened mammals in the hotspot also occur outside of it. For example, 18 threatened primates have ranges that overlap the hotspot but none are endemic to it.

Several large mammals are threatened and endemic to the hotspot. The northern pudu occurs on the upper east slope of the Andes from Colombia to Peru. Although formerly hunted, the species is now threatened by habitat loss due to agricultural expansion as well as persecution by dogs (IUCN 2013). The mountain tapir (*Tapirus pinchaque*) is the smallest of the South American tapirs, but it is the largest threatened mammal restricted to the Tropical Andes Hotspot. Less than 2,500 individuals are believed to persist in their range from Colombia to northern Peru, where they are threatened by hunting and habitat loss to cattle ranching (IUCN 2013). The emblematic spectacled bear ranges along the Andean cordillera from Venezuela to Bolivia. Despite many conservation efforts, the species continues to decline due to poaching (for crop damage prevention, meat and medicinal products), habitat loss due to expanding agriculture, and, in some places, mining and road development (Ruiz-García *et al.* 2005, IUCN 2013).

Species Conclusions

Overall, the list of globally threatened species (Appendix 4) is dominated by amphibians and by small, relatively obscure species. The list has a few well-known species as described in Chapter 3, and some networks already exist to coordinate conservation efforts. Most species are threatened by habitat loss, suggesting that preventing the drivers of deforestation where these species occur will be an important strategy. The narrow distributions of many threatened species fall outside of existing protected areas. Directing specific protection measures at these species is required in cases with imminent threats. Also important will be supporting the implementation of species conservation action plans that have been developed in several countries, especially for amphibians. Threatened species with broad ranges can benefit from networks of organizations, either existing or newly formed, that work to conserve different portions of the ranges. Examples include a wetland monitoring group for flamingos, a network for Andean cats and a *Polylepis* tree network.

Addressing amphibian chytridiomycosis is a challenge because practical *in situ* measures for controlling the disease have yet to be developed, although adopting biosecurity measures may prevent the spread of the fungus. The best strategy appears to be prioritizing protection of remnant populations of affected species and dispersal corridors to formerly inhabited areas. It is critical to protect these populations because individuals may have resistance to the disease and will be the founders of recovering populations. Alternatively, the climate in the locations of the surviving populations may prevent virulent outbreaks of the disease (Woodhams et al. 2011). In either case, protecting these sites is an urgent priority.

More extensive conservation status and digital distribution information is especially needed to improve conservation priority analyses. The highest priorities are Red List assessments for groups that reach their centers of diversity in the Tropical Andes because the habitats where these groups live have not been adequately covered by the existing data on birds, mammals and amphibians. Examples include vascular plants in the families Ericaceae, Fagaceae and Lauraceae, the genera *Espeletia*, *Puya* and *Azorella* and related páramo and puna species; reptiles in the genera *Anolis*, *Atractus*, *Ptychoglossus* and *Liolaemus*; and fishes in the Astroblepidae and genera *Orestias* and *Trichomycterus*. Although other species, especially invertebrates also occur in these habitats, plants, reptiles and fish are more likely to be sufficiently well known to meet the minimum data requirements for Red List assessments.

Participants at national stakeholder consultation workshops pointed out that some areas in the Tropical Andes remain relatively unexplored biologically due to limited access resulting either from social conflicts (e.g., parts of Colombia and Peru) or rugged terrain. Data gathered from stakeholder consultation meetings and records from the Global Biodiversity Information Facility (GBIF) combined with the map of KBAs highlight the need for additional biological inventory work in Sierra Nevada de Santa Marta and the eastern Cordillera of Colombia, the Cordillera del Condor of Ecuador, the Rio Utcubamba region of Peru, and the Peru-Bolivia border area.

Once these new data sets are available, a re-evaluation of KBAs and their irreplaceability will be needed to identify previously overlooked areas of high conservation need. This analysis should also contemplate data coming from the forthcoming IUCN assessments of the status of ecosystems as well as reptiles and freshwater species.

4.2 Site Outcomes

Site outcomes are determined by delineating KBAs, which are explicitly designed to conserve biodiversity at the greatest risk of extinction (Langhammer *et al.* 2007). The KBA methodology is data-driven, although, in data-poor regions, expert opinion also plays a critical role. All KBAs meet one or more standard criteria (Table 4.3).

Table 4.3. Criteria for Identifying KBAs in the Tropical Andes Hotspot

Criterion	Thresholds for Triggering KBA Status
Extinction Risk Regular occurrence of a globally threatened species at the site.	Inferred regular presence of: a) Critically Endangered (CR) species—presence of a single individual b) Endangered (EN) species—presence of a single individual c) Vulnerable (VU) species—presence of 30 individuals or 10 pairs
Range Restriction Site holds >5% of a species' global population at any stage of the species' lifecycle.	Inferred presence and sufficient extent of: a) Restricted-range species—species with a global range less than 50.000 km^2, or 5% of global population at a site b) Globally significant congregations—1% of global population seasonally at the site

In practice, most KBAs defined for the Tropical Andes have already been delimited as Important Bird Areas (IBAs), identified by BirdLife partner organizations and collaborating organizations in each hotspot country, or as Alliance for Zero Extinction (AZE) sites, defined as places that encompass the entire ranges of Endangered or Critically Endangered species (Ricketts *et al.* 2005). Important Plant Areas (IPA) have not been identified in the Tropical Andies. A detailed explanation of the methodology used to identify KBAs in the Tropical Andes can be found in Appendix 3.

The Tropical Andes Hotspot has 429 KBAs, including 337 IBAs, 116 AZE sites, and six new KBAs. Thirteen sites are still candidates for KBA status pending validation. In total, the KBAs cover 33,249,405 hectares, or about one-fifth of the hotspot, an area slightly smaller than the size of Germany. KBAs have an average size of 94,270 hectares, but are as small as 120 hectares and as large as 1.5 million hectares. Only the Indo-Burma Hotspot has more KBAs with 509 sites.

The 423 IBAs and AZE sites in the Tropical Andes cover an extensive area, and therefore make up the core of the KBAs for the hotspot. Many IBAs and AZE sites occur along the hotspot boundary and include areas both inside and outside of the hotspot. Thirty AZE sites completely overlap with IBAs, 31 AZE sites overlap partially with IBAs, and 15 IBAs overlap with another IBA. A summary of the KBAs in the hotspot countries is shown in Table 4.4, and details about each KBA are listed in Appendix 5.

Table 4.4. Summary of Site Outcomes for the Tropical Andes Hotspot

	Hotspot Area (ha)	KBA Area (ha)	Number of KBAs[1]	Percent of Country's Hotspot Area Covered by KBAs
Argentina	14,872,815	2,020,943	65	14%
Bolivia	37,000,926	8,480,276	43	23%
Chile	7,384,213	611,104	11	8%
Colombia	35,029,005	6,489,194	121	19%
Ecuador	11,786,728	4,093,960	79	35%
Peru	45,326,993	9,008,359	96	20%
Venezuela	6,952,335	2,545,570	27	37%
Tropical Andes	**158,353,016**	**33,249,405**	**442**	**21%**

[1] Includes 13 candidate KBAs.

Overview of KBAs

Venezuela

Three of Venezuela's 27 KBAs have high relative biodiversity value (Monumento Natural Pico Codazzi-VEN3, Parque Nacional Macarao-VEN10, Parque Nacional Henri Pittier-VEN9), each of which is a national park located in the Cordillera de la Costa Central (Figure 4.1, Table 4.5). These low coastal mountains are geologically older and more biologically related to the Caribbean than the Andes. These sites have high irreplaceability, endemism and threats, and provide valuable ecosystem services. The last remaining population of the only surviving harlequin toad species (*Atelopus cruciger*) in Venezuela occurs in Parque Nacional Henri Pittier. The Endangered red siskin finch (*Carduelis cucullata*) moves between dry forests and humid montane forests in this cordillera. The eastern-most population of the Endangered helmeted curassow (*Pauxi pauxi*) bird species occurs in these KBAs, where the species is in need of protection from hunting. The protection status of these KBAs provides some assurance against major deforestation, but their proximity to Caracas and other population centers is a fragmentation risk. The KBAs are critical for protecting the water source for these cities.

The Turimiquire KBA (VEN26), a 2,600-meter-high mountain designated as both an IBA and AZE site, is located on the eastern end of the Cordillera de la Costa. Besides high levels of endemism this KBA provides 90 percent of the water for urban and industry consumption in the northeast of the country.

The Sierra la Culata (VEN 14) and Sierra Nevada (VEN15) national parks are large KBAs located in the Venezuelan Andes. Both areas protect Andean páramos and upper montane forest, and possess high levels of plant endemism. These are protected areas established in 1950 and 1990, respectively, in an area that has not undergone significant land-use changes or pressure for infrastructure development or agricultural expansion. Ecosystem services provided by the parks are ecotourism (several private ecotourism reserves are located nearby) and the provision of water for hydropower and consumption in the state of Merida, which has a population of 900,000. The city of Merida participates in a water fund to conserve its main water source, a river originating in the Sierra la Culata.

Figure 4.1. KBAs in the Venezuelan Portion of the Tropical Andes Hotspot

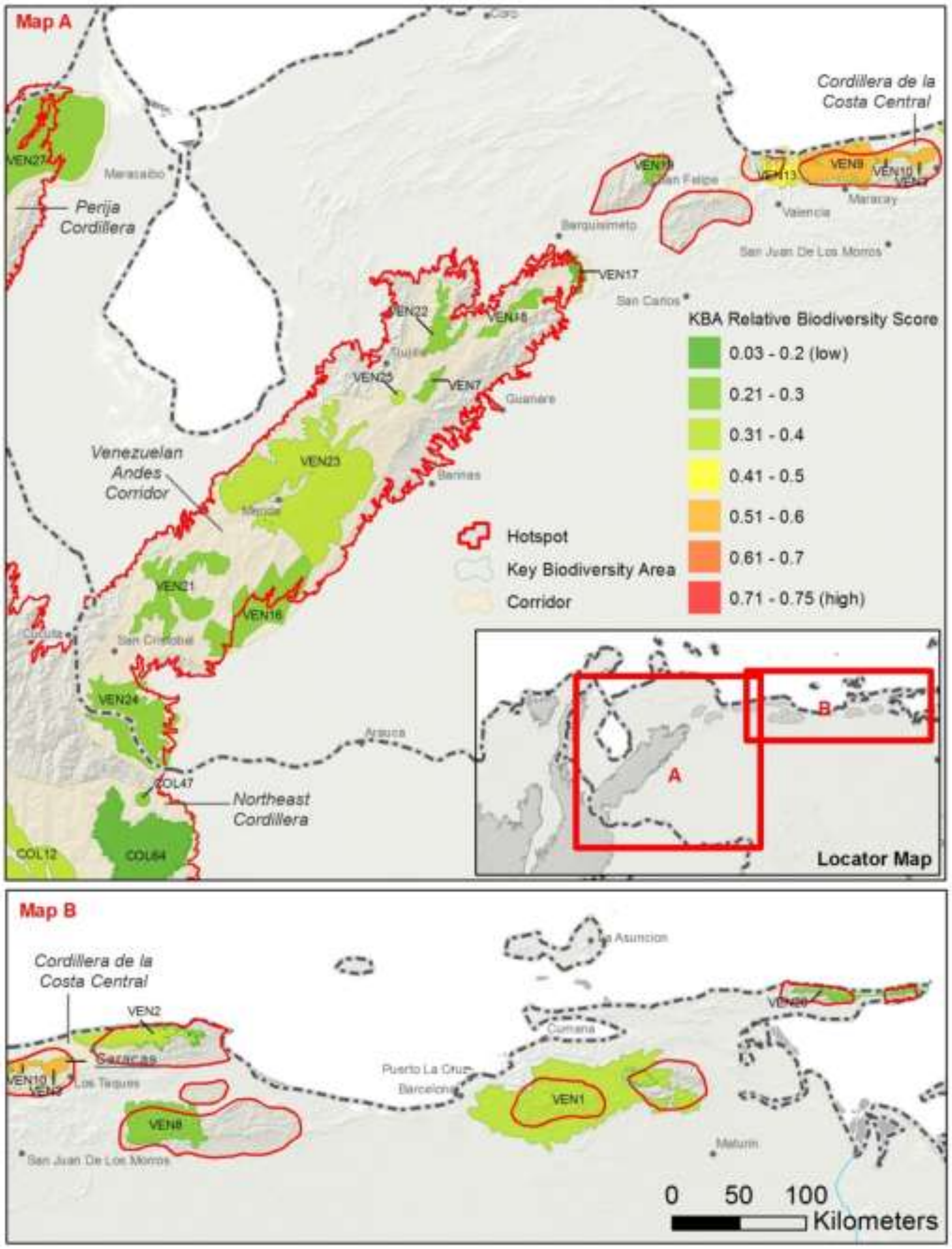


Table 4.5. KBAs in Venezuela

CEPF Code	KBA Name[1]	Area (ha)	Protection[2]	Mapped with Another KBA?[3]	Corridor
VEN1	Cordillera de Caripe	604,643	part	--	--
VEN2	El Avila National Park and surrounding areas	115,129	yes	--	Cordillera de la Costa Central
VEN3	Monumento Natural Pico Codazzi *	15,343	yes	--	Cordillera de la Costa Central
VEN4	Parque Nacional El Avila	107,269	yes	VEN2	Cordillera de la Costa Central
VEN5	Parque Nacional El Guácharo	46,191	yes	VEN1	--
VEN6	Parque Nacional El Tamá	165,424	yes	VEN24	Venezuelan Andes
VEN7	Parque Nacional Guaramacal	21,313	yes	--	Venezuelan Andes
VEN8	Parque Nacional Guatopo	156,405	part	--	--
VEN9	Parque Nacional Henri Pittier *	137,246	yes	--	Cordillera de la Costa Central
VEN10	Parque Nacional Macarao *	21,830	yes	--	Cordillera de la Costa Central
VEN11	Parque Nacional Páramos Batallón y La Negra	124,281	yes	VEN21	Venezuelan Andes
VEN12	Parque Nacional Perijá	381,355	yes	--	Perija Cordillera
VEN13	Parque Nacional San Esteban	55,571	yes	--	Cordillera de la Costa Central
VEN14	Parque Nacional Sierra La Culata	244,428	yes	VEN23	Venezuelan Andes
VEN15	Parque Nacional Sierra Nevada	337,605	yes	VEN23	Venezuelan Andes
VEN16	Parque Nacional Tapo-Caparo	226,536	yes	--	Venezuelan Andes
VEN17	Parque Nacional Terepaima	22,378	part	--	Venezuelan Andes
VEN18	Parque Nacional Yacambú	39,692	part	--	Venezuelan Andes
VEN19	Parque Nacional Yurubí	29,690	yes	--	--
VEN20	Peninsula de Paria National Park	50,489	part	--	--
VEN21	Páramos Batallón and La Negra National Parks and surrounding areas	183,435	part	--	Venezuelan Andes
VEN22	Refugio de Fauna Silvestre y Reserva de Pesca Parque Nacional Dinira	57,534	yes	--	Venezuelan Andes
VEN23	Sierra La Culata and Sierra Nevada National Parks and surrounding areas	647,622	yes	--	Venezuelan Andes
VEN24	Tamá	259,414	yes	--	Venezuelan Andes

CEPF Code	KBA Name[1]	Area (ha)	Protection[2]	Mapped with Another KBA?[3]	Corridor
VEN25	Tostós	8,202	no	--	Venezuelan Andes
VEN26	Zona Protectora Macizo Montañoso del Turimiquire	558,453	no	VEN1	--
VEN27	Zona Protectora San Rafael de Guasare	476,981	no	--	Perijá Cordillera

[1] Names of KBAs that are IBAs or AZE sites are those provided by the original sources. An * denotes KBAs with high relative biodiversity value.
[2] Yes: >80% of KBA overlaps a public protected area; part: 10-80% overlap; no: <10% overlap. See section on legal protection of KBAs for further information on designations.
[3] KBA not labeled in Figure 4.1 because it overlaps with indicated KBA.

Colombia

With 121 KBAs, Colombia has more KBAs than any other Andean country (Figures 4.2a and 4.2b, Table 4.6). Thirty-one KBAs have high relative biodiversity value, and 14 are located on the narrow Western Cordillera. Several KBAs include Pacific slope forests that transition to the Tumbes-Chocó-Magdalena Hotspot, another hotspot that has received CEPF investment (Figure 1.1). Seventeen species of threatened or range-restricted frogs together with three Critically Endangered, five Endangered and five Vulnerable bird species trigger these KBAs. The lower reaches of these KBAs overlap with the distribution ranges of mammals such as the Critically Endangered brown-headed spider monkey (*Ateles fusciceps*) and the range-restricted Hernández-Camacho's night monkey (*Aotus jorgehernandezi*). Other vulnerable mammals whose large ranges overlap with this area include spectacled bear, northern pudu, plus a large number of smaller and more range-restricted bats and rodents.

In the northern half of this chain of KBAs, the Tatama-Paraguas (COL112) and Serrania de Paraguas (COL106) KBAs contain mostly intact lower montane forests that lie southwest of Tatama National Park, a protected area of pristine páramo and cloud forest. However, the Colombian park service (SINAP) reports that Afro-descendent communities carry out artisan gold mining and subsistence agriculture inside the KBA. Information about the level of threat to these KBAs is mixed. On the one hand it is regarded as an example of a well-managed area with both public and private protected areas, but on the other hand, planned roads would open it to colonization and deforestation. Stakeholders also mentioned security problems in the area.

Farther south on the Western Cordillera, both Munchique National Park (COL67) and an adjacent area south of it were identified as KBAs. Munchique is a designated IBA located in the Salvajina dam watershed, which supplies Cali, a city of 2.4 million people, with electricity and water. The Munchique Sur portion is a new KBA (COL54) with high irreplaceability and the confirmed presence of highly restricted and threatened amphibians. These KBAs are located lower on the western slope than Tatama Paraguas and include true Chocó rainforest at 600 meters elevation. The area is inhabited by Embera indigenous communities and Afro-descendant communities who have collaborated in an effort to stop illegal mining in the national park and avoid contamination of their water sources. A road connecting the city of Popayan with the Pacific Coast runs between the KBAs. Forest conversion is constrained to the road's buffer area, although a few families live inside the park and have use and management agreements with the administration. This area is also affected by insecurity caused by illicit crops and drug trafficking.

Other KBAs on the Western Cordillera include the Región del Alto Calima (COL80), La Planada Natural Reserve (COL88, now under the administration of an Awá indigenous community), Páramo del Duende Regional Park (COL75, managed by the Department of Valle del Cauca), and Farallones de Cali National Park (COL65). The latter KBA is a source of water for hydropower facilities that contribute to the energy supply for Cali (in addition to the Salvajina dam).

Another Western Cordillera KBA worth highlighting is the Enclave Seco del Río Dagua (COL36), which hosts isolated dry woodland and xerophytic scrub. This KBA lies in a rain shadow, which causes a rare dry climate in the predominantly humid Western Cordillera. This KBA is also designated as an IBA and has undergone several management and designation efforts, most recently as a water conservation and integrated management district, both under the jurisdiction of the Department of Valle del Cauca. Among all KBAs, this is one of the most threatened due to long-term human occupation and agricultural use.

In the northern portion of the Central Cordillera, in the departments of Antioquia and Caldas, are the Selva de Florencia (COL100, with a small national protected area), Páramos del Sur de Antioquia (COL59) and Páramo de Sonson (COL57) KBAs. Selva de Florencia is an AZE site with the entire known population of the frog *Pristimantis actinolaimus*. The remaining 14 KBAs in the Central Cordillera include five KBAs of high relative biodiversity value. These are small KBAs mainly designated as IBAs (Cañón del Río Barbas y Bremen-COL14, Bosques del Oriente de Risaralda-COL10, Alto Quindío-COL6, Reserva la Patasola-COL37) with some level of management, either private or from the local government. All KBAs in the Central Cordillera represent the last remnants of Andean montane forests in a largely converted landscape, where urban expansion, livestock grazing, and expansion of coffee and other plantations have transformed this landscape long ago. This circumstance makes the protection of several of these KBAs important for the provision of water for a region with extensive agricultural activity and dense human populations.

Sierra Nevada de Santa Marta National Park (COL110), an isolated massif close to the Caribbean coast has been recognized as an irreplaceable protected area of global significance for biodiversity conservation due to the high number of restricted endemic birds, amphibians and small rodents that it hosts (Le Saout *et al.* 2013). The entire national park and surrounding areas are designated as an AZE site. Threats in the Sierra Nevada de Santa Marta include habitat destruction for the cultivation of illicit drugs. The Kogi and Arhuaco indigenous groups govern much of the area, and if they maintain traditional lifestyles, they can be major allies for biodiversity conservation. Beyond the mountain itself, roughly 1.2 million people are dependent upon the fresh water supply that drains down from the Sierra Nevada’s river basins.

The southern portion of the Eastern Cordillera has a group of four KBAs with high relative biodiversity values. One is an AZE site triggered by the frog species *Gastrotheca ruizi*. One KBA, Valle de Sibundoy and Laguna de la Cocha (COL115), is newly designated to cover the ranges of five threatened amphibians. This KBA includes some national (Laguna de la Cocha) and local reserves in a mosaic of forest fragments and extensive agricultural areas. It is in the transition zone between the Andes and the rainforests of the Amazon Basin, covered by montane and lower montane humid forests. Another KBA here is the Cueva de los Guacharos National Park (COL62), with a series of caves that are home to a large population of oilbirds (*Steatornis caripensis*).

Figure 4.2a. KBAs in the Northern Colombian Portion of the Tropical Andes Hotspot

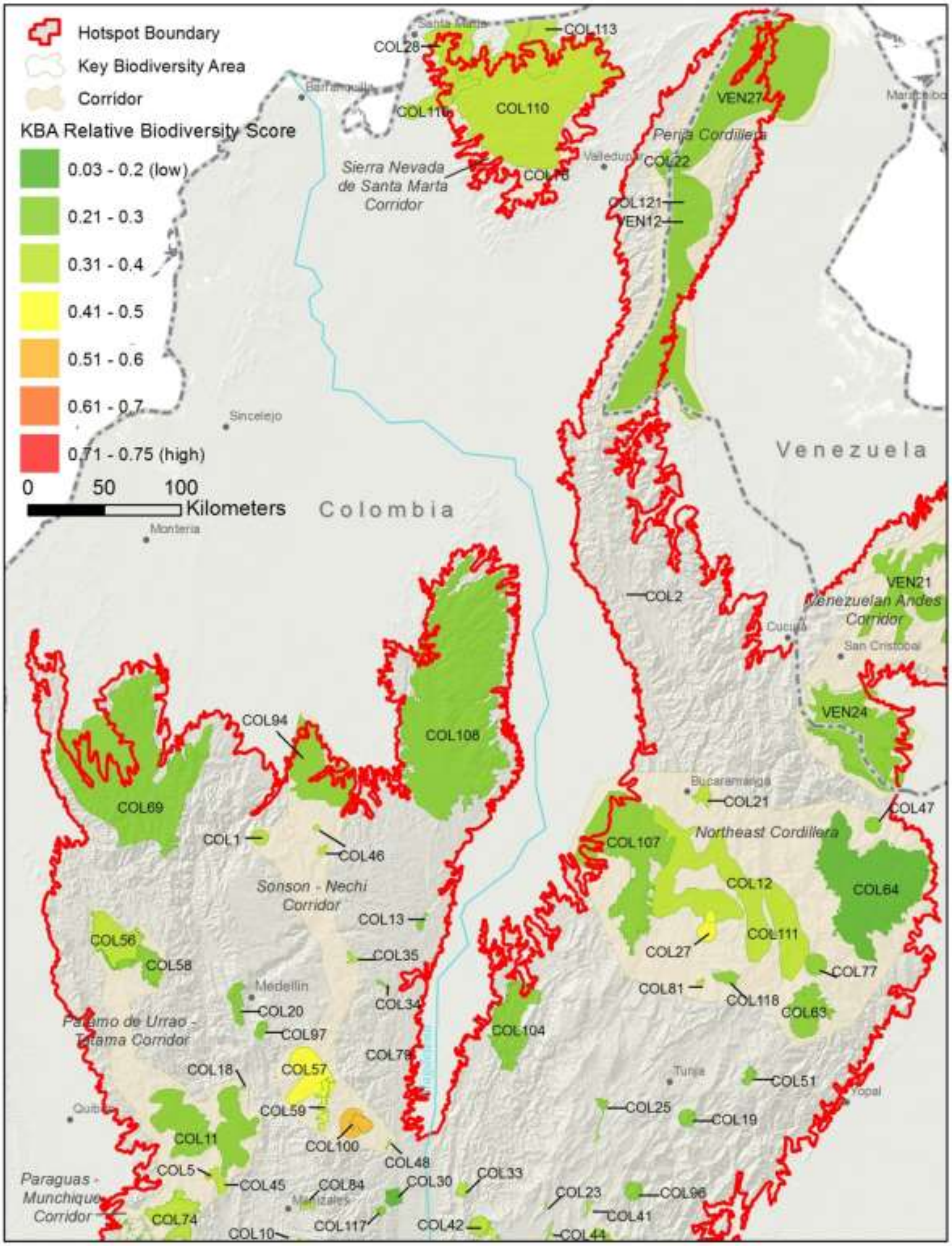


Figure 4.2b. KBAs in the Southern Colombian Portion of the Tropical Andes Hotspot

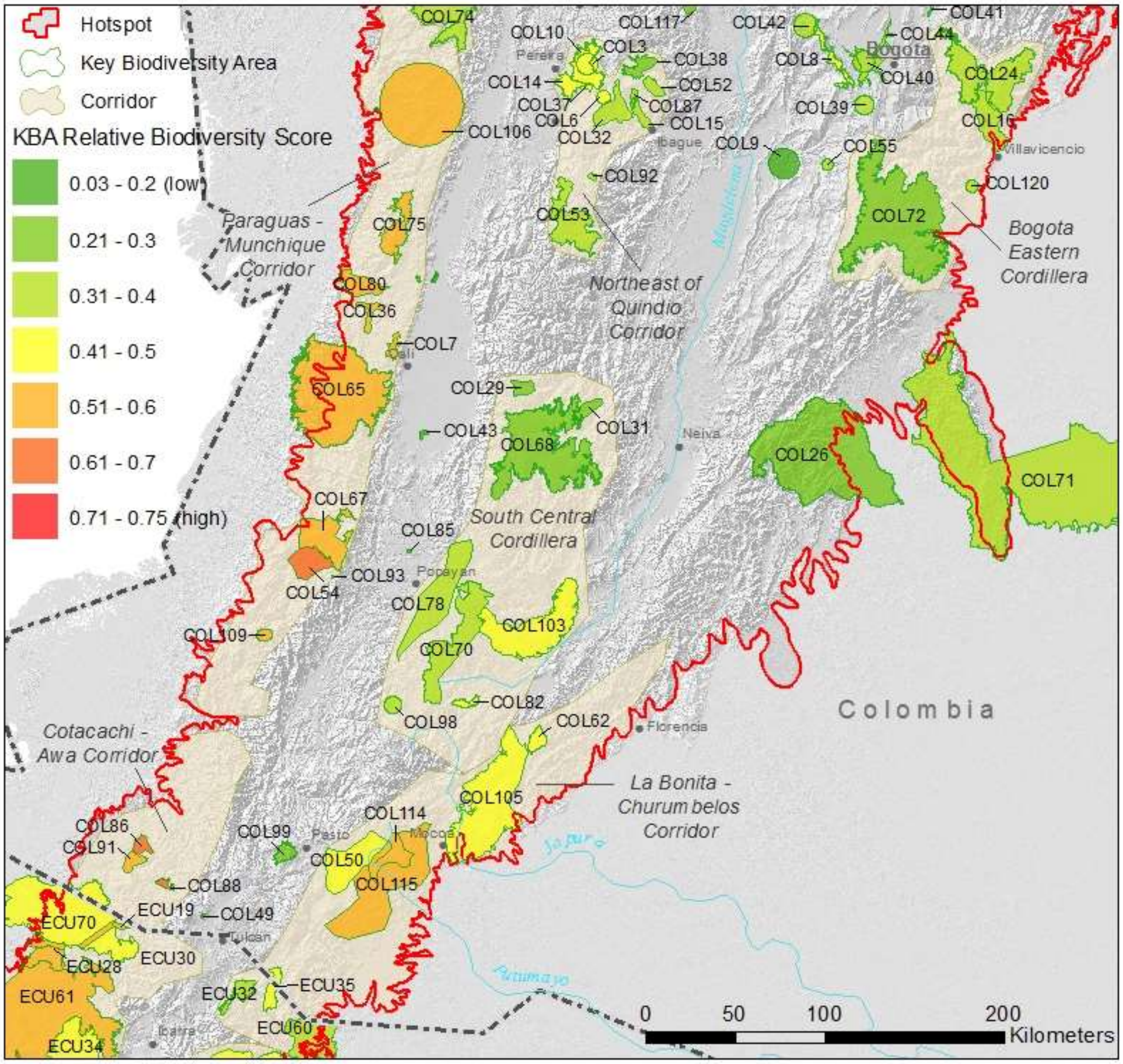


Table 4.6. KBAs in Colombia

CEPF Code	KBA Name[1]	Area (ha)	Protection[2]	Mapped with another KBA?[3]	Corridor
COL1	9km south of Valdivia	8,175	no	--	Sonson-Nechi
COL2	Agua de la Virgen	122	no	--	--
COL3	Albania *	11,034	yes	--	Northeast of Quindio
COL4	Alto de Oso *		no	--	Paraguas-Munchique

CEPF Code	KBA Name[1]	Area (ha)	Protection[2]	Mapped with another KBA?[3]	Corridor
		348			
COL5	Alto de Pisones *	1,381	no	--	Páramo de Urrao-Tatama
COL6	Alto Quindío *	4,582	yes	--	Northeast of Quindio
COL7	Bosque de San Antonio/Km 18 *	5,994	part	--	Paraguas-Munchique
COL8	Bosques de la Falla del Tequendama	12,597	no	--	--
COL9	Bosques de Tolemaida, Piscilago y alrededores	22,758	no	--	--
COL10	Bosques del Oriente de Risaralda *	27,610	yes	--	Northeast of Quindio
COL11	Bosques Montanos del Sur de Antioquia	200,575	part	--	Páramo de Urrao-Tatama
COL12	Bosques Secos del Valle del Río Chicamocha	395,012	part	--	Northeast Cordillera
COL13	Cañón del Río Alicante	3,271	part	--	--
COL14	Cañón del Río Barbas y Bremen *	11,194	part	--	Northeast of Quindio
COL15	Cañón del Río Combeima	7,589	no	--	Northeast of Quindio
COL16	Cañón del Río Guatiquía	34,160	no	--	Bogota Eastern Cordillera
COL17	Cañon del Rio Guatiqua and surroundings	32,742	no	COL16	Bogota Eastern Cordillera
COL18	Cafetales de Támesis	263	no	--	Páramo de Urrao-Tatama
COL19	Carretera Ramiriqui-Zetaquira	10,434	no	--	--
COL20	Cerro de Pan de Azúcar	18,685	no	--	--
COL21	Cerro La Judía	10,221	part	--	Northeast Cordillera
COL22	Cerro Pintado	12,292	no	--	Perija Cordillera
COL23	Cerros Occidentales de Tabio y Tenjo	472	no	--	--
COL24	Chingaza Natural National Park and surrounding areas	95,599	yes	--	Bogota Eastern Cordillera
COL25	Complejo Lacustre de Fúquene, Cucunubá y Palacio	4,728	no	--	--
COL26	Cordillera de los Picachos Natural National Park	304,154	yes	--	--
COL27	Coromoro *	17,637	no	--	Northeast Cordillera
COL28	Cuchilla de San Lorenzo	71,601	part	--	--
COL29	Cuenca del Río Hereje	8,258	no	--	South Central Cordillera
COL30	Cuenca del Río Jiménez	10,466	no	--	--

CEPF Code	KBA Name[1]	Area (ha)	Protection[2]	Mapped with another KBA?[3]	Corridor
COL31	Cuenca del Río San Miguel	9,050	no	--	South Central Cordillera
COL32	Cuenca del Río Toche	24,478	no	--	Northeast of Quindio
COL33	Cuenca Hidrográfica del Río San Francisco and surrounding area	5,453	part	--	--
COL34	Embalse de Punchiná y su zona de protección	1,406	yes	--	--
COL35	Embalse de San Lorenzo y Jaguas	2,651	yes	--	Sonson-Nechi
COL36	Enclave Seco del Río Dagua*	8,509	part	--	Paraguas-Munchique
COL37	Finca la Betulia Reserva la Patasola *	1,481	yes	--	Northeast of Quindio
COL38	Finca Paraguay	12,565	no	--	Northeast of Quindio
COL39	Fusagasuga	9,199	no	--	--
COL40	Granjas del Padre Luna	11,361	no	--	--
COL41	Gravilleras del Valle del Río Siecha	2,274	no	--	--
COL42	Hacienda La Victoria, Cordillera Oriental	13,617	no	--	--
COL43	Haciendas Ganaderas del Norte del Cauca	1,395	no	--	--
COL44	Humedales de la Sabana de Bogotá	20,682	no	--	--
COL45	La Empalada	10,561	part	--	Páramo de Urrao-Tatama
COL46	La Forzosa-Santa Gertrudis	4,106	no	--	Sonson-Nechi
COL47	La Salina	8,957	no	--	Northeast Cordillera
COL48	La Victoria	768	part	--	Sonson-Nechi
COL49	Lago Cumbal	371	no	--	--
COL50	Laguna de la Cocha	63,271	part	--	La Bonita-Churumbelos
COL51	Laguna de Tota	6,264	no	--	--
COL52	Lagunas Bombona y Vancouver	7,308	part	--	Northeast of Quindio
COL53	Loros Andinos Natural Reserve	53,923	no	--	Northeast of Quindio
COL54	Munchique Sur *	28,358	no	--	Paraguas-Munchique
COL55	Municipio de Pandi	3,289	no	--	--
COL56	Orquideas-Musinga-Carauta	71,363	yes	--	Páramo de Urrao-Tatama
COL57	Páramo de Sonsón *		no	--	Sonson-Nechi

CEPF Code	KBA Name[1]	Area (ha)	Protection[2]	Mapped with another KBA?[3]	Corridor
		73,042			
COL58	Páramo Urrao	35,297	yes	--	Páramo de Urrao-Tatama
COL59	Páramos del Sur de Antioquia *	14,094	no	--	Sonson-Nechi
COL60	Páramos y Bosques Altoandinos de Génova	12,549	no	COL153	Northeast of Quindio
COL61	Parque Nacional Natural Chingaza	87,019	yes	COL24	Bogota Eastern Cordillera
COL62	Parque Nacional Natural Cueva de los Guácharos *	9,720	part	--	La Bonita-Churumbelos
COL63	Parque Nacional Natural de Pisba	58,139	part	--	Northeast Cordillera
COL64	Parque Nacional Natural El Cocuy	364,203	yes	--	Northeast Cordillera
COL65	Parque Nacional Natural Farallones de Cali *	230,440	yes	--	Paraguas-Munchique
COL66	Parque Nacional Natural Las Orquídeas	35,212	yes	COL56	Páramo de Urrao-Tatama
COL67	Parque Nacional Natural Munchique *	52,107	yes	--	Paraguas-Munchique
COL68	Parque Nacional Natural Nevado del Huila	175,134	yes	--	South Central Cordillera
COL69	Parque Nacional Natural Paramillo	624,329	yes	--	--
COL70	Parque Nacional Natural Puracé	82,654	yes	--	South Central Cordillera
COL71	Parque Nacional Natural Sierra de la Macarena	696,882	yes	--	--
COL72	Parque Nacional Natural Sumapaz	239,661	yes	--	Bogota Eastern Cordillera
COL73	Parque Nacional Natural Tamá	62,484	yes	VEN24	Venezuelan Andes
COL74	Parque Nacional Natural Tatamá	59,414	part	--	Páramo de Urrao-Tatama
COL75	Parque Natural Regional Páramo del Duende *	32,136	part	--	Paraguas-Munchique
COL76	Pueblo Bello	1,269	no	--	--
COL77	Pueblo Viejo de Ura	15,998	no	--	Northeast Cordillera
COL78	Puracé	80,216	no	--	South Central Cordillera
COL79	Refugio Río Claro	527	no	--	--
COL80	Región del Alto Calima *	21,918	no	--	Paraguas-Munchique
COL81	Reserva Biológica Cachalú *	1,195	no	--	Northeast Cordillera
COL82	Reserva El Oso	4,998	no	--	South Central Cordillera
COL83	Reserva Forestal Yotoco	509	yes	--	Paraguas-Munchique

CEPF Code	KBA Name[1]	Area (ha)	Protection[2]	Mapped with another KBA?[3]	Corridor
COL84	Reserva Hidrográfica, Forestal y Parque Ecológico de Río Blanco	4,348	yes	--	--
COL85	Reserva Natural Cajibío	347	no	--	--
COL86	Reserva Natural El Pangán *	7,727	no	--	Cotacachi-Awa
COL87	Reserva Natural Ibanasca	2,393	part	--	Northeast of Quindio
COL88	Reserva Natural La Planada *	3,399	part	--	Cotacachi-Awa
COL89	Reserva Natural Laguna de Sonso	926	no	--	--
COL90	Reserva Natural Meremberg	2,168	no	--	South Central Cordillera
COL91	Reserva Natural Río Ñambí *	8,595	part	--	Cotacachi-Awa
COL92	Reserva Natural Semillas de Agua	1,270	no	--	Northeast of Quindio
COL93	Reserva Natural Tambito	125	no	--	Paraguas-Munchique
COL94	Reserva Regional Bajo Cauca Nechí	142,495	no	--	Sonson-Nechi
COL95	Reservas Comunitarias de Roncesvalles	41,374	no	COL53	Northeast of Quindio
COL96	San Isidro	11,107	no	--	--
COL97	San Sebastián	6,674	no	--	--
COL98	Santo Domingo	7,508	no	--	South Central Cordillera
COL99	Santuario de Fauna y Flora Galeras	8,884	yes	--	--
COL100	Selva de Florencia *	29,507	part	--	Sonson-Nechi
COL101	Selva de Florencia *	11,629	yes	COL100	Sonson-Nechi
COL102	Serrana de los Yarigues	288,265	yes	COL107	Northeast Cordillera
COL103	Serranía de las Minas *	109,935	part	--	South Central Cordillera
COL104	Serranía de las Quinchas	100,785	part	--	--
COL105	Serranía de los Churumbelos *	166,758	part	--	South Central Cordillera
COL106	Serranía de los Paraguas *	171,967	no	--	Paraguas-Munchique
COL107	Serranía de los Yariguíes	285,533	yes	--	Northeast Cordillera
COL108	Serranía de San Lucas	816,648	no	--	--
COL109	Serranía del Pinche *	4,870	part	--	Paraguas-Munchique
COL110	Sierra Nevada de Santa Marta		part	--	Sierra Nevada de Santa Marta

CEPF Code	KBA Name[1]	Area (ha)	Protection[2]	Mapped with another KBA?[3]	Corridor
	National Natural Park and surrounding areas *	652,714			National Park
COL111	Soatá	1,173	no	--	Northeast Cordillera
COL112	Tatama-Paraguas *	190,750	no	--	Paraguas-Munchique
COL113	Valle de San Salvador	76,833	yes	--	--
COL114	Valle de Sibundoy *	27,733	no	--	La Bonita-Churumbelos
COL115	Valle de Sibundoy & Laguna de la Cocha *	137,362	part	--	La Bonita-Churumbelos
COL116	Valle del Río Frío	47,995	part	--	--
COL117	Vereda el Llano	3,306	no	--	--
COL118	Vereda Las Minas	10,311	no	--	Northeast Cordillera
COL119	Vereda Las Minas and surrounding area	11,660	no	COL118	Northeast Cordillera
COL120	Villavicencio	3,770	no	--	Bogota Eastern Cordillera
COL121	Serranía de Perijá	402,011	yes	--	Perija Cordillera

[1] Names of KBAs that are IBAs or AZE sites are those provided by the original sources. An * denotes KBAs with high relative biodiversity value.
[2] Yes: >80% of KBA overlaps a public protected area; part: 10-80% overlap; no: <10% overlap. See section on legal protection of KBAs for further information on designations.
[3] KBA not labeled in Figures 4.2a and 4.2b because it overlaps with indicated KBA.

Ecuador

Despite its relatively small size, Ecuador has 79 KBAs in the hotspot. These KBAs combine to cover 35 percent of the portion of the hotspot in the country (Figure 4.3, Table 4.7). Twenty-eight KBAs have high relative biodiversity values. They are distributed in three regions: the country's northwest, northeast and southeast. Three of the most irreplaceable sites of Ecuador occur northwest of Quito on the Western Cordillera, an area well known for its rich avifauna. Mindo and the western foothills of Volcan Pichincha (ECU44) and Rio Toachi-Chiriboga (ECU66) are both AZEs and IBAs, while Maquipucuna-Rio Guayllabamba is an IBA (ECU43). These KBAs share nine threatened bird species, among them the black-breasted puffleg (*Eriocnemis nigrivestis*), a Critically Endangered hummingbird. The area is a patchwork of agricultural land, natural ecosystems (some of which are under national or subnational protection), and a number of private reserves with ecotourism operations. Portions of these KBAs have suffered relatively high disturbance, with 25 percent of the area affected. In spite of a long history of conservation activity and public awareness of the biological importance of this area, threats from the expansion and intensification of agricultural activities persist. The area also suffers from land speculation due to the recent increases in property values.

Farther north on the Western Cordillera and abutting the Ecuadorian portion of the Tumbes-Chocó-Magdalena Hotspot, there is a group of seven KBAs, six of which are biological priorities. The largest is the Cotacachi Cayapas Ecological Reserve KBA (ECU61), which is surrounded by KBAs aligned with private protected areas (Los Cedros-ECU14, Intag-Toisán-ECU34) and the indigenous territories of the Awa, also designated as KBA (ECU70). The Awa territory extends into Colombia where it is also a KBA. The area in Ecuador features páramos and montane forest along an elevation gradient. Human natural resource use in the area is principally selective logging, livestock grazing and subsistence farming. Mining concessions are planned for the Intag-Toisán area, but local communities have organized in opposition. They have designated private protected forests and communal reserves, implementing conservation and livelihood projects.

Four KBAs of high relative biodiversity value are located on Ecuador's Eastern Cordillera. Three of these KBAs correspond to national protected areas and the fourth, Cordillera de Huacamayos-San Isidro-Sierra Azul (ECU25), includes private reserves. The three protected areas, Antisana (ECU58), Cayambe-Coca (ECU59), and Sumaco-Napo Galeras (ECU52) encompass diverse habitats grading from high páramos dotted with lakes down to sub-Andean forest that then transitions to the rainforests of the Amazon basin. Cayambe Coca and Antisana are crucial for water provision to the city of Quito and surrounding towns, and both get contributions from a water fund for their management. Together these KBAs and the KBAs northwest of Quito, benefit a population of around three million with sustained provision of water. To the southeast, Podocarpus National Park (ECU50) and the Cordillera del Condor KBA (ECU27) are renowned for high endemism levels and vegetation types that are remarkably distinct because of a geologic history different than that of the rest of the Ecuadorean Andes. The Cordillera del Condor and the adjacent KBA Bosque Protector Alto Nangaritza (ECU9) have rock outcrops and plateau formations that support a unique flora that was discovered recently because of improved accessibility. Overall these KBAs have relatively undisturbed landscapes, although the Cordillera del Condor is threatened by existing and planned large-scale mining. Nangaritza, Condor Cordillera and its adjacent counterpart in Peru overlap with indigenous territories where the vegetation is mostly in its native state but hunting pressure depresses wildlife abundance.

Four KBAs with high relative biodiversity value are located in the central portion of Ecuador's Eastern Cordillera. Together these KBAs encompass habitats that range from sub-Andean forests on the Amazonian slope to páramos and mountains and in the Sangay National Park (ECU51). The KBAs overlap the distributional ranges of more than 100 Vulnerable, Endangered and Critically Endangered vertebrates. The major threat is a newly improved road network surrounding Sangay National Park, including a road that goes through it. The hydrological resources of these KBAs are used for irrigation and hydropower.

Figure 4.3. KBAs in the Ecuadorian Portion of the Tropical Andes Hotspot

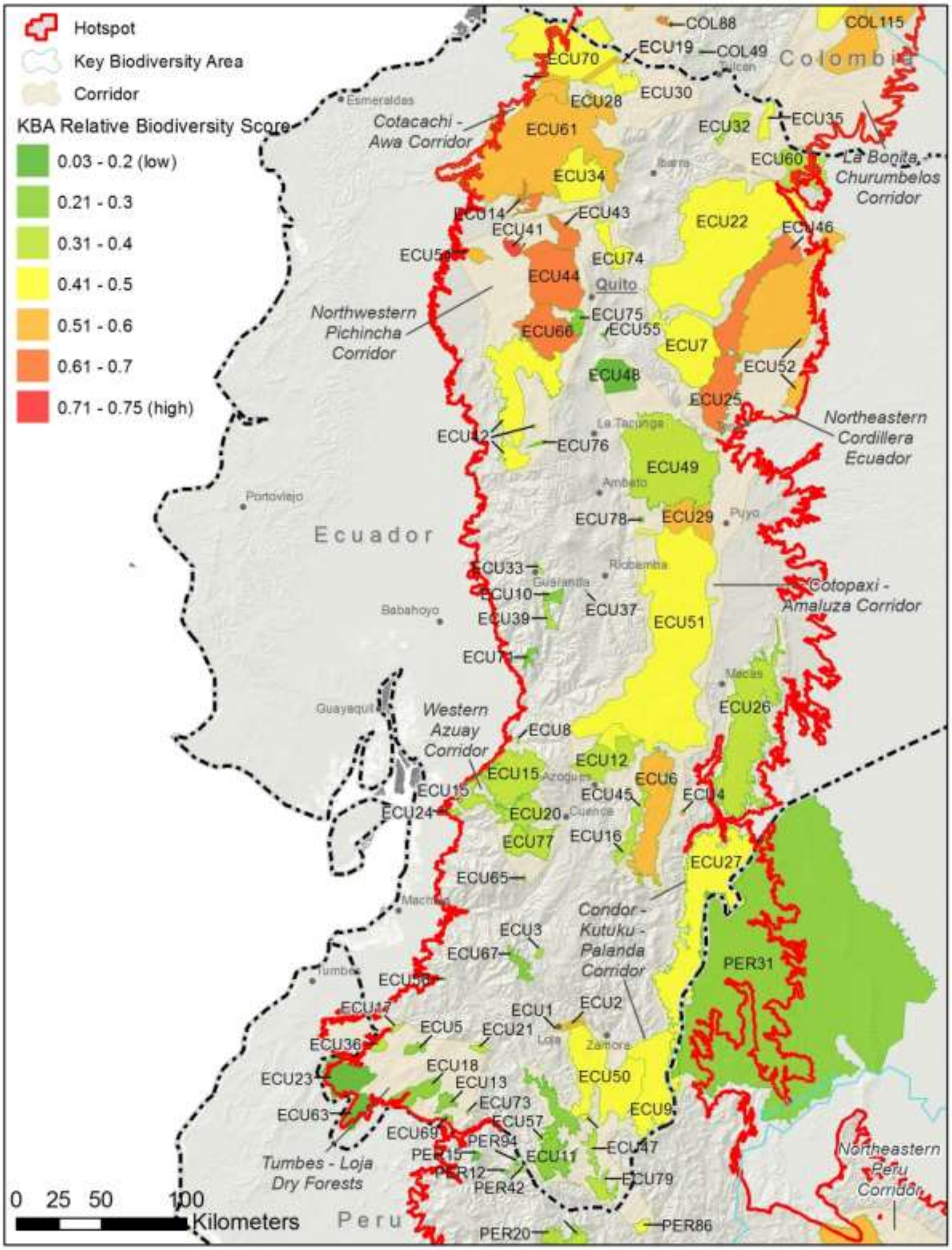


Table 4.7. KBAs in Ecuador

CEPF Code	KBA Name[1]	Area (ha)	Protection[2]	Mapped with another KBA?[3]	Corridor
ECU1	1 km west of Loja *	672	no	--	Condor-Kutuku-Palanda
ECU2	Abra de Zamora *	6,671	part	--	Condor-Kutuku-Palanda
ECU3	Acanamá-Guashapamba-Aguirre	1,995	no	--	--
ECU4	Agua Rica *	807	no	--	Cotopaxi-Amaluza
ECU5	Alamor-Celica	6,529	no	--	Tumbes-Loja Dry Forests
ECU6	Alrededores de Amaluza *	109,052	no	--	Cotopaxi-Amaluza
ECU7	Antisana Ecological Reserve and surrounding areas *	112,570	yes	--	Northeastern Cordillera Ecuador
ECU8	Azuay Basin	238	no	--	Western Azuay
ECU9	Bosque Protector Alto Nangaritza *	112,692	no	--	Condor-Kutuku-Palanda
ECU10	Bosque Protector Cashca Totoras	6,813	no	--	--
ECU11	Bosque Protector Colambo-Yacuri	63,919	part	--	Condor-Kutuku-Palanda
ECU12	Bosque Protector Dudas-Mazar	72,258	part	--	Cotopaxi-Amaluza
ECU13	Bosque Protector Jatumpamba-Jorupe	8,112	no	--	Tumbes-Loja Dry Forests
ECU14	Bosque Protector Los Cedros *	12,788	no	--	Cotacachi - Awa
ECU15	Bosque Protector Molleturo Mullopungo	99,964	no	--	Western Azuay
ECU16	Bosque Protector Moya-Molón	12,377	no	--	Cotopaxi-Amaluza
ECU17	Bosque Protector Puyango	2,713	no	--	Tumbes-Loja Dry Forests
ECU18	Cañón del río Catamayo	27,635	no	--	Tumbes-Loja Dry Forests
ECU19	Cabacera del Rio Baboso *	8,079	no	--	Cotacachi-Awa
ECU20	Cajas-Mazán	31,682	yes	--	Western Azuay
ECU21	Catacocha	3,738	no	--	Tumbes-Loja Dry Forests
ECU22	Cayambe-Coca Ecological Reserve and surrounding areas *	408,619	yes	--	Northeastern Cordillera Ecuador
ECU23	Cazaderos-Mangaurquillo	51,006	no	--	Tumbes-Loja Dry Forests
ECU24	Cerro de Hayas-Naranjal	2,656	no	--	Western Azuay
ECU25	Cordillera de Huacamayos-San Isidro-Sierra Azul *	68,714	part	--	Northeastern Cordillera Ecuador

CEPF Code	KBA Name[1]	Area (ha)	Protection[2]	Mapped with another KBA?[3]	Corridor
ECU26	Cordillera de Kutukú	191,036	no	--	Condor-Kutuku-Palanda
ECU27	Cordillera del Cóndor *	257,018	no	--	Condor-Kutuku-Palanda
ECU28	Corredor Awacachi *	28,436	part	--	Cotacachi-Awa
ECU29	Corredor Ecológico Llanganates-Sangay *	49,417	part	--	Cotopaxi-Amaluza
ECU30	El Ángel-Cerro Golondrinas	47,788	part	--	Cotacachi-Awa
ECU31	El Angel-Cerro Golondrinas and surrounding areas	49,887	part	ECU30	Cotacachi-Awa
ECU32	Estación Biológica Guandera-Cerro Mongus	13,094	no	--	La Bonita-Churumbelos
ECU33	Guaranda, Gallo Rumi	1,867	no	--	--
ECU34	Intag-Toisán *	65,005	no	--	Cotacachi-Awa
ECU35	La Bonita-Santa Bárbara *	13,064	no	--	La Bonita-Churumbelos
ECU36	La Tagua	6,624	no	--	Tumbes-Loja Dry Forests
ECU37	Lago de Colta	122	no	--	--
ECU38	Laguna Toreadora	843	part	--	Western Azuay
ECU39	Las Guardias	6,066	no	--	--
ECU40	Los Bancos-Caoni	2,053	no	--	Northwestern Pichincha
ECU41	Los Bancos-Milpe *	8,272	no	--	Northwestern Pichincha
ECU42	Los Illinizas Ecological Reserve and surrounding areas *	140,354	part	--	Northwestern Pichincha
ECU43	Maquipucuna-Río Guayllabamba *	21,070	no	--	Northwestern Pichincha
ECU44	Mindo and western foothills of Volcan Pichincha *	103,494	no	--	Northwestern Pichincha
ECU45	Montañas de Zapote-Najda	9,700	no	--	Cotopaxi-Amaluza
ECU46	Region between P. Nacional Sumaco Napo-Galeras & Baeza Lumbaqui	88,468	no	--	Northeastern Cordillera Ecuador
ECU47	Palanda	9,457	no	--	Condor-Kutuku-Palanda
ECU48	Parque Nacional Cotopaxi	37,844	yes	--	Cotopaxi-Amaluza
ECU49	Parque Nacional Llanganates	230,333	yes	--	Cotopaxi-Amaluza
ECU50	Parque Nacional Podocarpus *	147,572	yes	--	Condor-Kutuku-Palanda
ECU51	Parque Nacional Sangay *	535,892	yes	--	Cotopaxi-Amaluza

CEPF Code	KBA Name[1]	Area (ha)	Protection[2]	Mapped with another KBA?[3]	Corridor
ECU52	Parque Nacional Sumaco-Napo Galeras *	220,148	yes	--	Northeastern Cordillera Ecuador
ECU53	Pilaló *	335	no	ECU42	Northwestern Pichincha
ECU54	Río Caoní *	9,101	no	--	Northwestern Pichincha
ECU55	Refugio de Vida Silvestre Pasochoa	701	part	--	--
ECU56	Reserva Buenaventura	351	no	--	--
ECU57	Reserva Comunal Bosque de Angashcola	1,944	no	--	Condor-Kutuku-Palanda
ECU58	Reserva Ecológica Antisana *	103,578	yes	ECU52	Northeastern Cordillera Ecuador
ECU59	Reserva Ecológica Cayambe-Coca *	394,406	yes	ECU22	Northeastern Cordillera Ecuador
ECU60	Reserva Ecológica Cofán-Bermejo	56,092	part	--	La Bonita-Churumbelos
ECU61	Reserva Ecológica Cotacachi-Cayapas *	369,936	part	--	Cotacachi-Awa
ECU62	Reserva Ecológica Los Illinizas y alrededores *	125,932	yes	ECU42	Northwestern Pichincha
ECU63	Reserva Natural Tumbesia-La Ceiba-Zapotillo	19,377	no	--	Tumbes-Loja Dry Forests
ECU64	Reserva Tapichalaca *	1,965	no	--	Condor-Kutuku-Palanda
ECU65	Reserva Yunguilla	769	no	--	Western Azuay
ECU66	Rio Toachi-Chiriboga *	72,084	no	--	Northwestern Pichincha
ECU67	Selva Alegre	11,474	no	--	--
ECU68	Sumaco Napo Galeras and surrounding areas *	210,438	yes	ECU52	Northeastern Cordillera Ecuador
ECU69	Tambo Negro	1,946	no	--	Tumbes-Loja Dry Forests
ECU70	Territorio Étnico Awá y alrededores *	204,930	no	--	Cotacachi-Awa
ECU71	Tiquibuzo	4,965	no	--	--
ECU72	Toachi	4,305	no	--	Northwestern Pichincha
ECU73	Utuana-Bosque de Hanne	338	no	--	Tumbes-Loja Dry Forests
ECU74	Valle de Guayllabamba *	24,364	no	--	Northwestern Pichincha
ECU75	Volcán Atacazo	9,317	no	--	Northwestern Pichincha
ECU76	West of the Páramo de Apagua	1,860	no	--	Northwestern Pichincha
ECU77	Yanuncay-Yanasacha	39,681	no	--	Western Azuay
ECU78	Yungilla	995	no	--	Cotopaxi-Amaluza

CEPF Code	KBA Name[1]	Area (ha)	Protection[2]	Mapped with another KBA?[3]	Corridor
ECU79	Zumba-Chito	13,968	no	--	Condor-Kutuku-Palanda

[1] Names of KBAs that are IBAs or AZE sites are those provided by the original sources. An * denotes KBAs with high relative biodiversity value.
[2] Yes: >80% of KBA overlaps a public protected area; part: 10-80% overlap; no: <10% overlap. See section on legal protection of KBAs for further information on designations.
[3] KBA not labeled in Figure 4.3 because it overlaps with indicated KBA.

Peru

Peru occupies the largest share of the Tropical Andes, covering 29 percent of the hotspot, and has the second highest number of KBAs (96). In the north, the Huancabamba Depression is the lowest pass of the Andean Cordillera and one of the largest inter-Andean dry valleys. As described in Chapter 3, the Huancabamba Depression is a major barrier that isolates many high-elevation species to the north or south. The dry valleys support numerous endemic species, and provide a natural corridor connecting populations of dry forest species on both sides of the cordillera. The Western Cordillera of the Andes in northern Peru is much drier than further north due to the influence of the cold Humboldt oceanic current which creates climatic conditions dry enough for the occurrence of desert along Peru's Pacific coast.

Peru's KBAs are concentrated on the eastern flank of the Andes, with fewer KBAs located on the dry western flank or in inter-Andean valleys (Figures 4.4a and 4.4b and Table 4.8). All 19 KBAs with high relative biodiversity value are located on the eastern flank. Seven of these occur in northeastern Peru, including Abra Patricia-Alto Mayo (PER7), Cordillera de Colán (PER29), Moyobamba (PER65), Chachapoyas (PER4) and Rio Utcubamba (PER84). Two endangered bird species (Lulu's tody-flycatcher *Poecilotriccus luluae* and ochre-fronted antpitta *Grallaricula ochraceifrons*) and two threatened amphibians are endemic to this area. In sum, the ranges of more than 120 other threatened species overlap this area, which includes both public and private reserves. The area is threatened by planned roads and land tenure issues, but has benefited from sustained investments in conservation and sustainable productive activities over the last few years. Hydrological resources of the Cordillera de Colán assure clean water provision to 60,000 people who live downstream along the Utcubamba and Chiriaco Rivers.

Central Peru has three KBAs with high relative biodiversity value: Yanachaga Chemillen (PER34), Carpish (PER17) and Playa Pampa (PER73). Yanachaga is a national park and Carpish is both an AZE and IBA. Carpish was highlighted by local stakeholders because of its importance for endemic birds and other species. Currently it is a highly threatened area due to encroaching agriculture and grazing, but efforts by the local government are underway to designate it as a sub-national protected area.

The remaining Peruvian KBAs are in the south. Kosnipata Carabaya (PER44) is a new KBA that extends between the upper part of Manu National Park and the Quincemil IBA. This KBA together with the Ocobamba-Cordillera de Vilcanota KBA (PER66) coincide with regional priority areas identified by the Cuzco departmental government. The Ocobamba-Vilcanota candidate KBA overlaps with several private conservation areas established and managed by Huayruro and Q'Ero indigenous communities. The famous Machu Picchu Sanctuary is also included among this group of high relative biodiversity value KBAs. The ranges of 27 Critically Endangered and Endangered species overlap with this group of sites. The main threat identified in these KBAs is mining because of its direct impacts and water usage.

Figure 4.4a. KBAs in the Northern Peruvian Portion of the Tropical Andes Hotspot

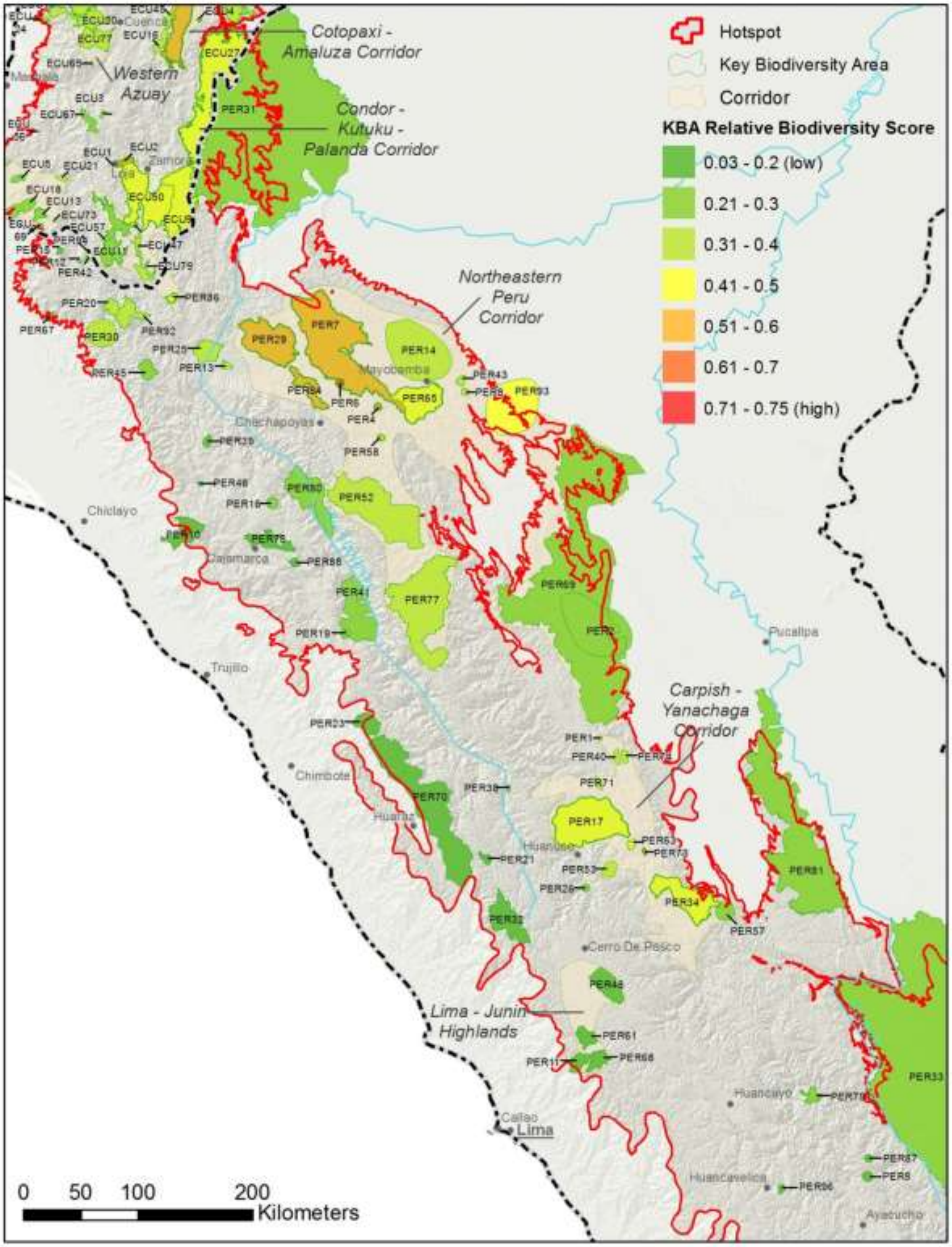


Figure 4.4b. KBAs in the Southern Peruvian Portion of the Tropical Andes Hotspot

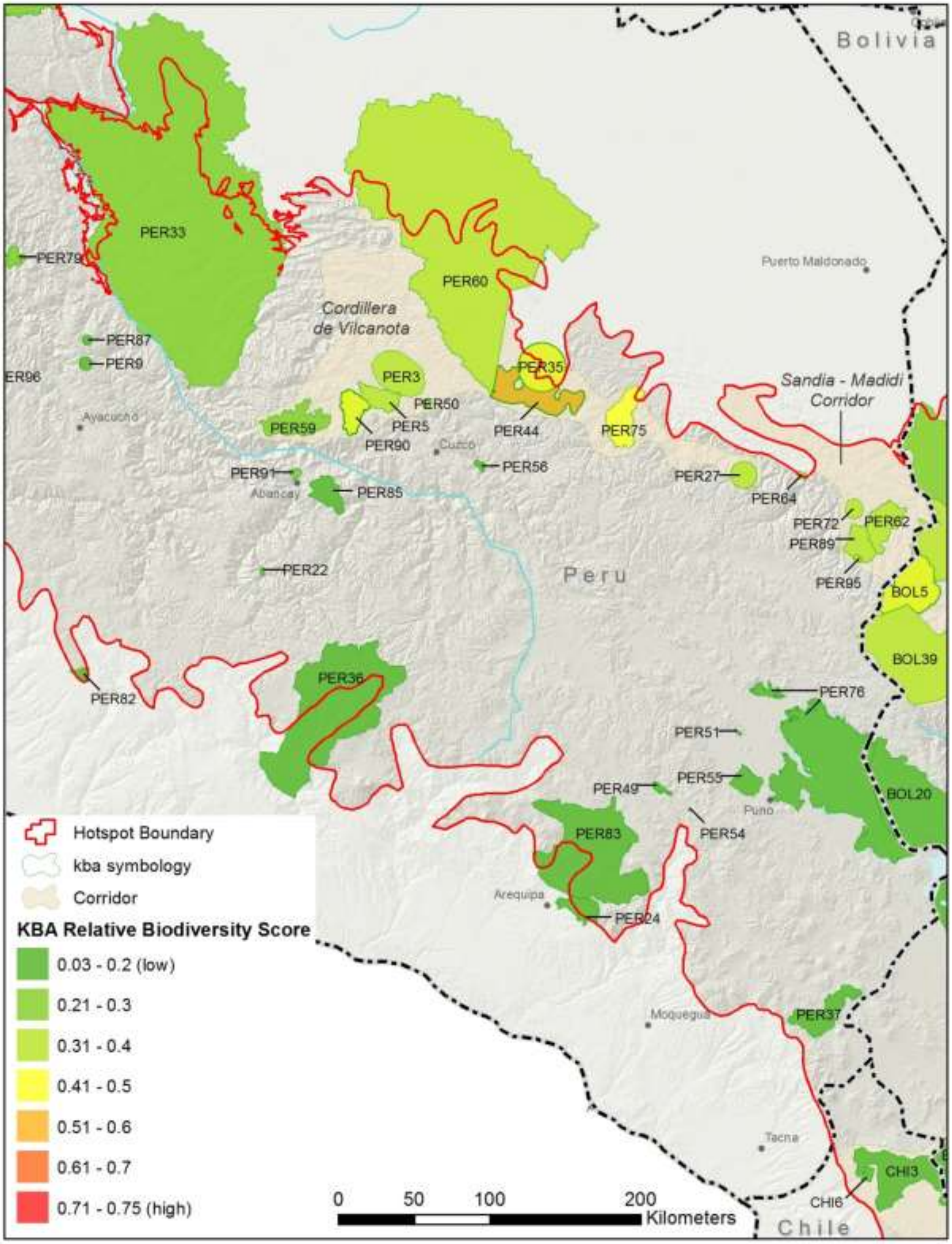


Table 4.8. KBAs in Peru

CEPF Code	KBA Name[1]	Area (ha)	Protection[2]	Mapped with aAnother KBA?[3]	Corridor
PER1	17 km southeast of Aucayacu	975	no	--	Carpish-Yanachaga
PER2	20 km NW of Boca Apua	232,949	yes	--	Northeastern Peru
PER3	6 km south of Ocobamba	76,851	no	--	Cordillera de Vilcanota
PER4	7 km East of Chachapoyas *	2,896	no	--	Northeastern Peru
PER5	Abra Málaga-Vilcanota	31,083	part	--	Cordillera de Vilcanota
PER6	Abra Pardo de Miguel *	4,195	part	--	Northeastern Peru
PER7	Abra Patricia - Alto Mayo *	353,411	part	--	Northeastern Peru
PER8	Abra Tangarana	3,673	yes	--	Northeastern Peru
PER9	Abra Tapuna	6,096	no	--	--
PER10	Alto Valle del Saña	48,028	part	--	--
PER11	Alto Valle Santa Eulalia-Milloc	19,698	no	--	Lima-Junin Highlands
PER12	Aypate	973	no	--	--
PER13	Bagua	5,160	no	--	--
PER14	Between Balsa Puerto and Moyabamba	224,397	no	--	Northeastern Peru
PER15	Bosque de Cuyas	2,165	no	--	--
PER16	Celendín	7,628	no	--	--
PER17	Carpish (IBA) *	203,317	no	--	Carpish-Yanachaga
PER18	Carpish (AZE) *	211,340	no	PER17	Carpish-Yanachaga
PER19	Carretera Otuzco-Huamachuco 2	5,229	no	--	--
PER20	Cerro Chinguela	13,523	no	--	--
PER21	Cerro Huanzalá-Huallanca	6,325	no	--	--
PER22	Chalhuanca	1,428	no	--	--
PER23	Champará	31,195	no	--	--
PER24	Chiguata	30,501	no	--	--
PER25	Chinchipe	34,556	no	--	--

CEPF Code	KBA Name[1]	Area (ha)	Protection[2]	Mapped with aAnother KBA?[3]	Corridor
PER26	Conchamarca	3,661	no	--	--
PER27	Cordillera Carabaya	24,612	no	--	Cordillera de Vilcanota
PER28	Cordillera de Colán (IBA) *	63,667	yes	PER29	Northeastern Peru
PER29	Cordillera de Colán (AZE) *	134,874	part	--	Northeastern Peru
PER30	Cordillera de Huancabamba	50,734	no	--	--
PER31	Cordillera del Cóndor	1,664,008	part	--	Condor-Kutuku-Palanda
PER32	Cordillera Huayhuash y Nor-Oyón	74,497	yes	--	--
PER33	Cordillera Vilcabamba	2,184,234	part	--	--
PER34	Cordillera Yanachaga *	105,017	yes	--	Carpish-Yanachaga
PER35	Cosñipata Valley *	79,499	no	--	Cordillera de Vilcanota
PER36	Cotahuasi	451,539	yes	--	--
PER37	Covire	61,345	part	--	--
PER38	Cullcui	1,619	no	--	--
PER39	Cutervo National Park and surrounding areas	5,714	part	--	--
PER40	Daniel Alomias Robles	6,324	no	--	Carpis -Yanachaga
PER41	El Molino	116,438	no	--	--
PER42	Huamba	2,551	no	--	--
PER43	Jesús del Monte	4,966	yes	--	Northeastern Peru
PER44	Kosnipata Carabaya *	86,512	no	--	Cordillera de Vilcanota
PER45	La Cocha	18,185	no	--	--
PER46	La Esperanza	1,558	no	--	--
PER47	Lacco-Yavero Megantoni	121,653	part	--	Cordillera de Vilcanota
PER48	Lago de Junín	49,714	yes	--	Lima-Junin Highlands
PER49	Lago Lagunillas	4,514	no	--	--
PER50	Lagos Yanacocha	2,440	no	--	Cordillera de Vilcanota
PER51	Laguna de Chacas	848	no	--	--
PER52	Laguna de los Cóndores	261,648	no	--	Northeastern Peru

CEPF Code	KBA Name[1]	Area (ha)	Protection[2]	Mapped with aAnother KBA?[3]	Corridor
PER53	Laguna Gwengway	14,678	no	--	Carpish-Yanachaga
PER54	Laguna Maquera	120	no	--	--
PER55	Laguna Umayo	25,340	no	--	--
PER56	Lagunas de Huacarpay	3,373	no	--	
PER57	Llamaquizú stream	20,967	part	--	Carpish-Yanachaga
PER58	Los Chilchos to Leymebamba Trail *	2,353	no	--	Northeastern Peru
PER59	Mandorcasa	62,444	part	--	Cordillera de Vilcanota
PER60	Manu National Park	1,589,517	yes	--	Cordillera de Vilcanota
PER61	Marcapomacocha	20,636	no	--	Lima-Junin Highlands
PER62	Maruncunca	49,712	no	--	Sandia-Madidi
PER63	Milpo	4,850	no	--	Carpish-Yanachaga
PER64	Mina Inca	2,265	no	--	
PER65	Moyobamba *	91,528	no	--	Northeastern Peru
PER66	Ocobamba-Cordillera de Vilcanota *	67,862	no	--	Cordillera de Vilcanota
PER67	Paltashaco	3,350	no	--	
PER68	Pampas Pucacocha y Curicocha	21,581	no	--	Lima-Junin Highlands
PER69	Parque Nacional Cordillera Azul	1,316,593	yes	--	Northeastern Peru
PER70	Parque Nacional Huascarán	325,361	yes	--	
PER71	Parque Nacional Tingo María	4,579	yes	--	Carpish-Yanachaga
PER72	Phara	12,276	no	--	Sandia-Madidi
PER73	Playa Pampa *	1,176	no	--	Carpish-Yanachaga
PER74	Previsto	6,475	no	--	Carpish-Yanachaga
PER75	Quincemil	58,324	no	--	Cordillera de Vilcanota
PER76	Ramis y Arapa (Lago Titicaca, sector Peruano)	444,218	no	--	
PER77	Río Abiseo y Tayabamba	309,652	yes	--	Northeastern Peru
PER78	Río Cajamarca	37,871	no	--	
PER79	Río Mantaro-Cordillera Central	13,428	no	--	

CEPF Code	KBA Name[1]	Area (ha)	Protection[2]	Mapped with aAnother KBA?[3]	Corridor
PER80	Río Marañón	106,116	no	--	
PER81	Reserva Comunal El Sira	588,463	yes	--	
PER82	Reserva Nacional Pampa Galeras	7,395	yes	--	
PER83	Reserva Nacional Salinas y Aguada Blanca	337,737	yes	--	
PER84	Rio Utcubamba *	35,534	no	--	Northeastern Peru
PER85	Runtacocha-Morococha	33,477	no	--	
PER86	San Jose de Lourdes *	5,005	no	--	Condor-Kutuku-Palanda
PER87	San Jose de Secce	3,447	no	--	
PER88	San Marcos	4,477	no	--	
PER89	Sandia	33,077	no	--	Sandia-Madidi
PER90	Santuario Histórico Machu Picchu *	34,690	yes	--	Cordillera de Vilcanota
PER91	Santuario Nacional del Ampay	3,577	yes	--	
PER92	Santuario Nacional Tabaconas-Namballe	33,674	yes	--	
PER93	Tarapoto	184,514	part	--	Northeastern Peru
PER94	Toldo	2,864	no	--	
PER95	Valcón	1,882	no	--	Sandia-Madidi
PER96	Yauli	3,666	no	--	

[1] Names of KBAs that are IBAs or AZE sites are those provided by the original sources. An * denotes KBAs with high relative biodiversity value.
[2] Yes: >80% of KBA overlaps a public protected area; part: 10-80% overlap; no: <10% overlap. See section on legal protection of KBAs for further information on designations.
[3] KBA not labeled in Figures 4.4a and 4.4b because it overlaps with indicated KBA.

Bolivia

Bolivia has 43 KBAs, 10 of which have high relative biodiversity value (Figure 4.5, Table 4.9). As in Peru, all KBAs with high relative biodiversity value in Bolivia are on the eastern slope of the Andes. These KBAs support upper montane Polylepis forest, montane Yungas forests with interspersed dry forests at lower elevations, and, at higher elevations, a unique mixed grassland and shrubland vegetation that is locally called "*Yungas páramos*". The northernmost KBA with high relative biodiversity value is Bosque de Polylepis de Madidi (BOL5), an IBA that overlaps with the upper montane Polylepis forest of Madidi National Park/IMNA. None of the other KBAs qualify as having high relative biodiversity value because of the relatively large distributions of the threatened species that occur there (even those KBAs that include Madidi or

Apolobamba national parks, which are widely regarded as containing exceptionally high levels of species richness).

Another group of KBAs with high relative biodiversity value is located in the Yungas near La Paz. The Cotapata KBA (BOL13) overlaps the smaller Cotapata National Park/IMNA and the small Zongo Valley KBAs (BOL43; extent 1,500 ha). Surrounding these are two other small IBAs with high irreplaceability. The Cotapata KBA provides habitat for the Critically Endangered royal cinclodes (*Cinclodes aricomae*) and the entire distribution range of two amphibians, one Critically Endangered (*Oreobates zongoensis*) and the other Endangered (*Yunganastes bisignatus*). The Chulumani-Cajuata KBA does not have any legal protection but contains the entire known distribution of a Vulnerable amphibian and overlaps ranges of several other threatened species. The Carrasco KBA (BOL40), which overlaps with Carrasco National Park, is another irreplaceable site of global significance for biodiversity conservation (Le Saout *et al.* 2013). Despite its legal protection, this area is currently enduring large-scale intervention and conversion by coca growers.

A few KBAs are located in the high Bolivian Altiplano, some of them proposed as candidate KBAs (BOL17, BOL18, BOL28) because of hosting few but highly endemic amphibian and fish species, which have specialized to inhabit the extreme conditions of saline lakes or salt flats characteristic of the Bolivian xerophytic puna.

Figure 4.5. KBAs in the Bolivian Portion of the Tropical Andes Hotspot

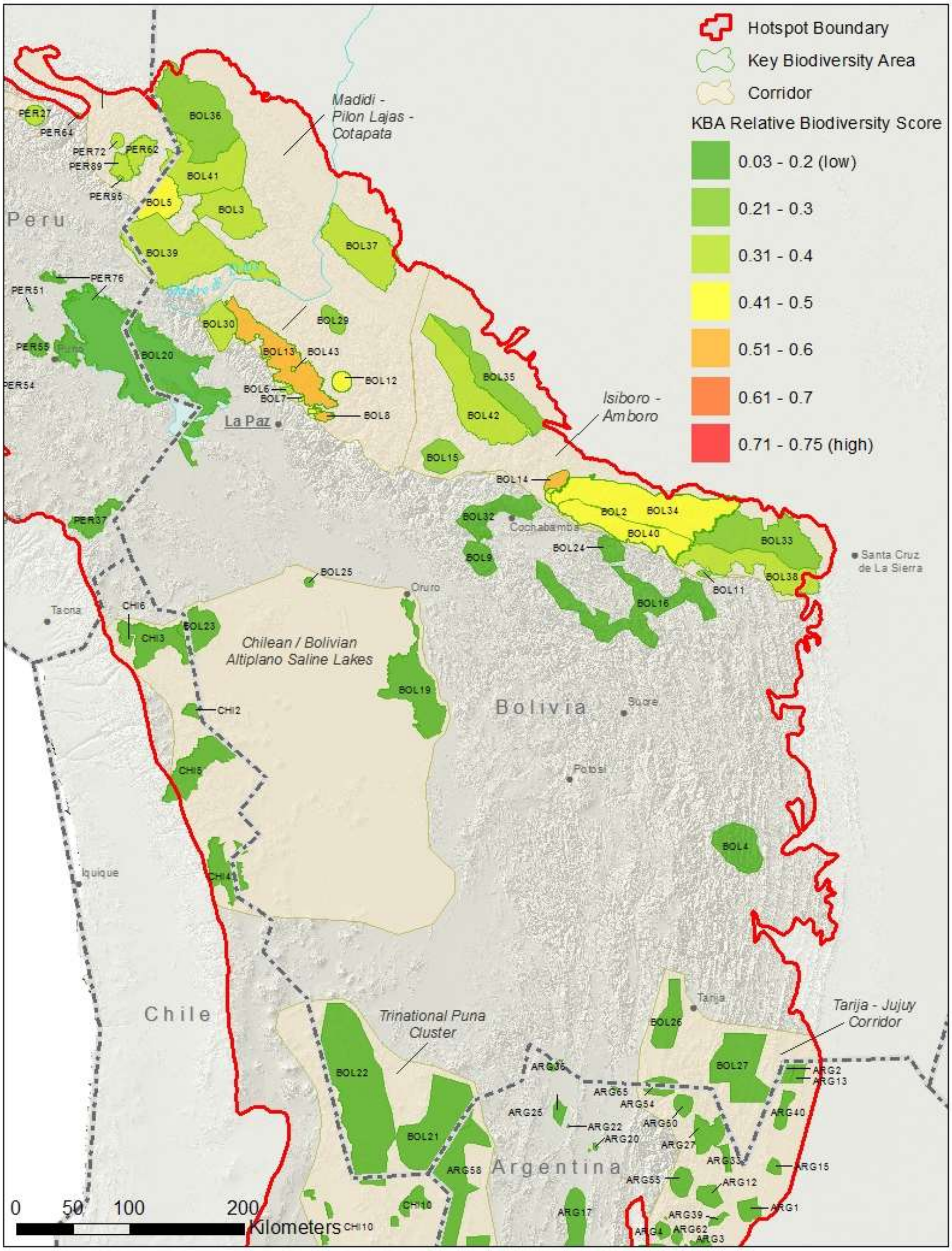


Table 4.9. KBAs in Bolivia

CEPF Code	KBA Name[1]	Area (ha)	Protection[2]	Mapped with another KBA?[3]	Corridor
BOL1	Alto Amboró	399,213	yes	BOL33, BOL38	Isiboro-Amboró
BOL2	Alto Carrasco and surrounding areas	638,324	yes	--	Isiboro-Amboró
BOL3	Apolo	177,181	part	--	Madidi-Pilón Lajas-Cotapata
BOL4	Azurduy	133,353	no	--	--
BOL5	Bosque de Polylepis de Madidi *	94,614	yes	--	Madidi-Pilón Lajas-Cotapata
BOL6	Bosque de Polylepis de Mina Elba	5,778	yes	--	Madidi-Pilón Lajas-Cotapata
BOL7	Bosque de Polylepis de Sanja Pampa *	1,878	yes	--	Madidi-Pilón Lajas-Cotapata
BOL8	Bosque de Polylepis de Taquesi *	3,456	no	--	Madidi-Pilón Lajas-Cotapata
BOL9	Cerro Q'ueñwa Sandora	57,876	no	--	--
BOL10	Chulumani - Cajuata *	104,736	no	--	Madidi-Pilón Lajas-Cotapata
BOL11	Comarapa	5,888	no	--	Isiboro-Amboró
BOL12	Coroico *	25,569	no	--	Madidi-Pilón Lajas-Cotapata
BOL13	Cotapata *	265,202	part	--	Madidi-Pilón Lajas-Cotapata
BOL14	Cristal Mayu y Alrededores *	29,441	no	--	Isiboro-Amboró
BOL15	Cuenca Cotacajes	76,410	no	--	Isiboro-Amboró
BOL16	Cuencas de Ríos Caine y Mizque	339,205	no	--	--
BOL17	Huayllamarka	74,814	no	--	Chilean / Bolivian Altiplano Saline Lakes
BOL18	Lago Coipasa	345,309	no	--	Chilean / Bolivian Altiplano Saline Lakes
BOL19	Lago Poopó y Río Laka Jahuira	239,129	no	--	Chilean / Bolivian Altiplano Saline Lakes
BOL20	Lago Titicaca (Sector Boliviano)	382,806	no	--	--
BOL21	Lagunas de Agua Dulce del Sureste de Potosí	310,647	part	--	Trinational Puna

CEPF Code	KBA Name[1]	Area (ha)	Protection[2]	Mapped with another KBA?[3]	Corridor
BOL22	Lagunas Salinas del Suroeste de Potosí	611,736	part	--	Trinational Puna
BOL23	Parque Nacional Sajama	97,238	part	--	Chilean / Bolivian Altiplano Saline Lakes
BOL24	Quebrada Mojón	40,427	no	--	--
BOL25	Río Huayllamarca	5,259	no	--	Chilean / Bolivian Altiplano Saline Lakes
BOL26	Reserva Biológica Cordillera de Sama	94,532	yes	--	Tarija-Jujuy
BOL27	Reserva Nacional de Flora y Fauna Tariquía	229,604	yes	--	Tarija-Jujuy
BOL28	Salar de Uyuni	1,364,463	no	--	Chilean / Bolivian Altiplano Saline Lakes
BOL29	Serranía Bella Vista	33,391	no	--	Madidi-Pilón Lajas-Cotapata
BOL30	Tacacoma-Quiabaya y Valle de Sorata	87,333	no	--	Madidi-Pilón Lajas-Cotapata
BOL31	Valle La Paz	147,656	no	--	--
BOL32	Vertiente Sur del Parque Nacional Tunari	128,142	yes	--	--
BOL33	Yungas Inferiores de Amboró	299,926	yes	--	Isiboro-Amboró
BOL34	Yungas Inferiores de Carrasco	425,537	yes	--	Isiboro-Amboró
BOL35	Yungas Inferiores de Isiboro-Sécure/Altamachi	193,813	yes	--	Isiboro-Amboró
BOL36	Yungas Inferiores de Madidi	372,951	yes	--	Madidi-Pilón Lajas-Cotapata
BOL37	Yungas Inferiores de Pilón Lajas *	249,858	yes	--	Madidi-Pilón Lajas-Cotapata
BOL38	Yungas Superiores de Amboró	245,394	yes	--	Isiboro-Amboró
BOL39	Yungas Superiores de Apolobamba	433,346	yes	--	Madidi-Pilón Lajas-Cotapata
BOL40	Yungas Superiores de Carrasco *	205,748	yes	--	Isiboro-Amboró
BOL41	Yungas Superiores de Madidi	240,426	yes	--	Madidi-Pilón Lajas-Cotapata
BOL42	Yungas Superiores de Mosetenes y Cocapata	337,229	part	--	Isiboro-Amboró
BOL43	Zongo Valley *	1,475	no	--	Madidi-Pilón Lajas-Cotapata

[1] Names of KBAs that are IBAs or AZE sites are those provided by the original sources. An * denotes KBAs with high relative biodiversity value.
[2] Yes: >80% of KBA overlaps a public protected area; part: 10-80% overlap; no: <10% overlap. See section on legal protection of KBAs for further information on designations.
[3] KBA not labeled in Figure 4.5 because it overlaps with indicated KBA.

Argentina

The southernmost portions of humid montane forests and puna grasslands in the hotspot reach into Argentina. Although Argentina has a diversity of habitats, no KBA has the number of threatened species or level of irreplaceability of threatened species to rank among the KBAs with high relative biodiversity value (Figure 4.6, Table 4.10). Relative biodiversity values for Argentinian KBAs range from 0.03-0.18, reflecting the large ranges and low threat status of species there.

The hotspot in Argentina includes eastern Andean slope forests and dry grasslands and scrub in the upper altiplano or puna. The 65 KBAs identified for Argentina nevertheless contain a few threatened species such as the Tucuman amazon (*Amazona tucuman*), a parrot restricted to northern Argentina and southern Bolivia with an important population stronghold in the Parque Nacional El Rey KBA (ARG30). Most of the KBAs are small and correspond to IBAs in the forested areas also known as "*Yungas Argentinas.*" Here, ongoing conservation efforts have succeeded to some extent to limit the logging and conversion of these forests. KBAs in the upper altiplano, such as the Sistema de lagunas de Vilama-Pululos KBA (ARG58) encompass national parks with lakes that support concentrations of flamingos.

Figure 4.6. KBAs in the Chilean and Argentinian Portions of the Tropical Andes Hotspot

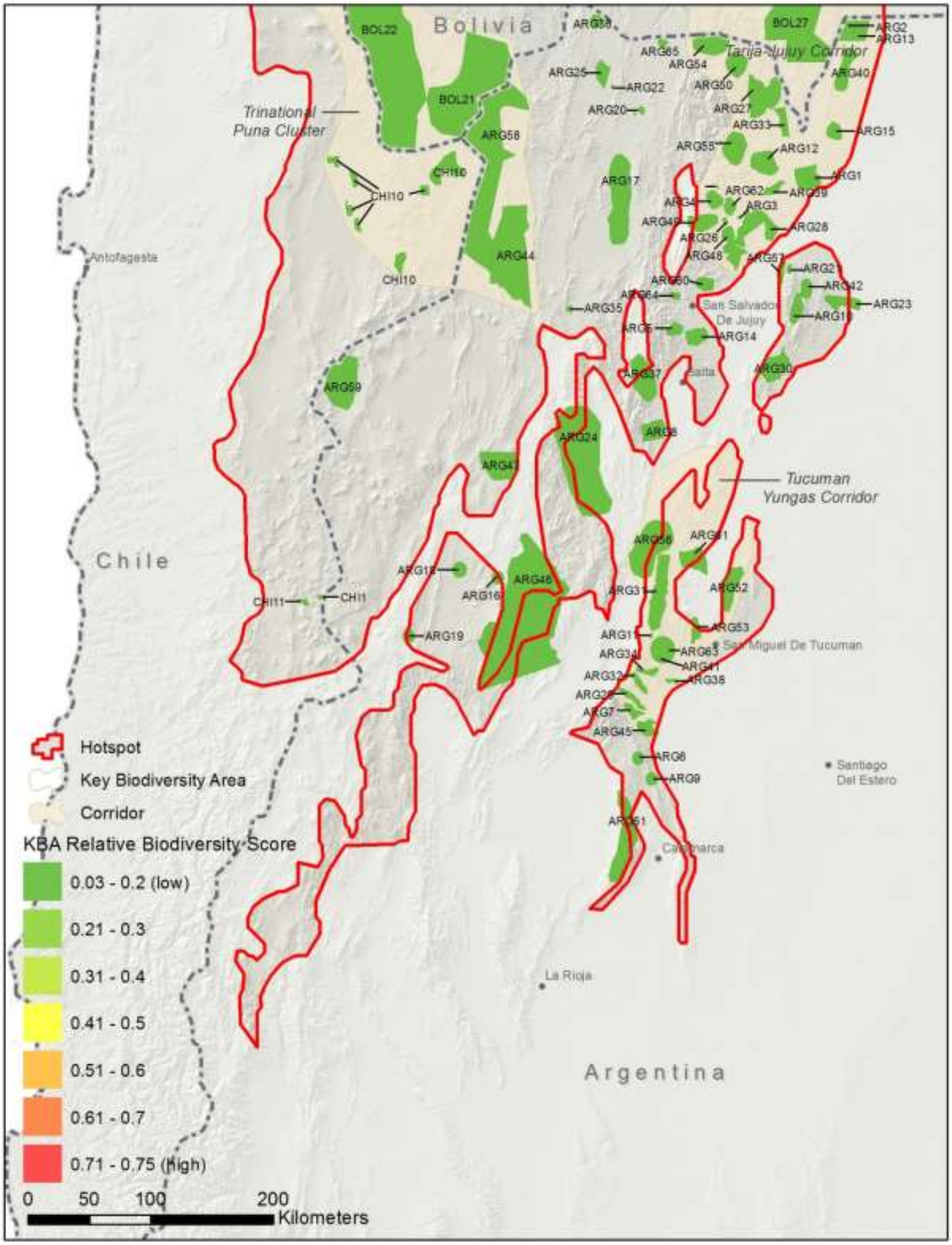


Table 4.10. KBAs in Argentina

CEPF Code	KBA Name[1]	Area (ha)	Protection[2]	Corridor
ARG1	Abra Grande	32,429	part	Tarija-Jujuy
ARG2	Acambuco	23,475	part	Tarija-Jujuy
ARG3	Alto Calilegua	774	yes	Tarija-Jujuy
ARG4	Caspala y Santa Ana	14,612	yes	Tarija-Jujuy
ARG5	Cerro Negro de San Antonio	9,935	no	--
ARG6	Cuesta de las Higuerillas	7,158	no	--
ARG7	Cuesta del Clavillo	9,145	no	Tucuman Yungas
ARG8	Cuesta del Obispo	25,435	no	--
ARG9	Cuesta del Totoral	7,734	no	--
ARG10	El Fuerte y Santa Clara	17,891	no	--
ARG11	El Infiernillo	708	part	Tucuman Yungas
ARG12	Fincas Santiago y San Andrés	32,943	yes	Tarija-Jujuy
ARG13	Itiyuro-Tuyunti	20,948	part	Tarija-Jujuy
ARG14	La Cornisa	19,445	no	--
ARG15	La Porcelana	13,276	no	Tarija-Jujuy
ARG16	Laguna Grande	7,672	yes	--
ARG17	Laguna Guayatayoc	108,520	no	--
ARG18	Laguna La Alumbrera	10,796	no	--
ARG19	Laguna Purulla	7,796	no	--
ARG20	Lagunas Runtuyoc - Los Enamorados	2,494	no	--
ARG21	Lagunas San Miguel y El Sauce	2,214	no	--
ARG22	Lagunillas	551	yes	--
ARG23	Lotes 32 y 33, Maíz Gordo	23,032	part	--
ARG24	Luracatao y Valles Calchaquíes	267,288	no	--
ARG25	Monumento Natural Laguna de Los Pozuelos	15,870	yes	--
ARG26	Pampichuela	1,828	yes	Tarija-Jujuy
ARG27	Parque Nacional Baritú	65,123	yes	Tarija-Jujuy
ARG28	Parque Nacional Calilegua	68,333	yes	Tarija-Jujuy
ARG29	Parque Nacional Campo de los Alisos	9,044	part	Tucuman Yungas
ARG30	Parque Nacional El Rey	35,915	yes	--
ARG31	Parque Provincial Cumbres Calchaquíes	61,225	part	Tucuman Yungas
ARG32	Parque Provincial La Florida	8,392	part	Tucuman Yungas
ARG33	Parque Provincial Laguna Pintascayoc	14,227	yes	Tarija-Jujuy

CEPF Code	KBA Name[1]	Area (ha)	Protection[2]	Corridor
ARG34	Parque Provincial Los Ñuñorcos y Reserva Natural Quebrada del Portugués	6,761	yes	Tucuman Yungas
ARG35	Pueblo Nuevo	1,751	yes	--
ARG36	Queñoales de Santa Catalina	9,730	yes	--
ARG37	Quebrada del Toro	54,938	no	--
ARG38	Río Los Sosa	2,436	no	Tucuman Yungas
ARG39	Río Santa María	9,339	yes	Tarija-Jujuy
ARG40	Río Seco	30,654	no	Tarija-Jujuy
ARG41	Reserva Natural de La Angostura	1,508	part	Tucuman Yungas
ARG42	Reserva Natural Las Lancitas	12,009	part	--
ARG43	Reserva Provincial de Uso Múltiple Laguna Leandro	370	yes	Tarija-Jujuy
ARG44	Reserva Provincial Olaroz-Cauchari	190,097	part	Trinational Puna
ARG45	Reserva Provincial Santa Ana	15,586	part	Tucuman Yungas
ARG46	Reserva Provincial y de la Biosfera Laguna Blanca	522,754	part	--
ARG47	Salar del Hombre Muerto	58,811	no	--
ARG48	San Francisco-Río Jordan	9,895	yes	Tarija-Jujuy
ARG49	San Lucas	25,926	part	Tarija-Jujuy
ARG50	Santa Victoria, Cañani y Cayotal	25,543	yes	Tarija-Jujuy
ARG51	Sierra de Ambato	76,195	no	--
ARG52	Sierra de Medina	38,389	no	Tucuman Yungas
ARG53	Sierra de San Javier	11,792	yes	Tucuman Yungas
ARG54	Sierra de Santa Victoria	38,983	no	Tarija-Jujuy
ARG55	Sierra de Zenta	37,689	yes	Tarija-Jujuy
ARG56	Sierras de Carahuasi	102,695	no	Tucuman Yungas
ARG57	Sierras de Puesto Viejo	9,075	no	
ARG58	Sistema de lagunas de Vilama-Pululos	303,783	yes	Trinational Puna
ARG59	Socompá-Llullaillaco	87,293	yes	--
ARG60	Tiraxi y Las Capillas	13,008	yes	--
ARG61	Trancas	32,092	no	Tucuman Yungas
ARG62	Valle Colorado y Valle Grande	9,743	yes	Tarija-Jujuy
ARG63	Valley of Tafi	33,551	part	Tucuman Yungas
ARG64	Yala	4,090	yes	--
ARG65	Yavi y Yavi Chico	4,570	no	--

[1] Names of KBAs that are IBAs or AZE sites are those provided by the original sources. An * denotes KBAs with high relative biodiversity value.

[2] Yes: >80% of KBA overlaps a public protected area; part: 10-80% overlap; no: <10% overlap. See section on legal protection of KBAs for further information on designations.

Chile

In Chile, the hotspot is situated entirely on the semi-desert altiplano where there are 11 KBAs (Figure 4.6, Table 4.11). The KBAs in Chile are small areas, and some correspond to national parks, national reserves and a national monument. Although several endemic species occur in the KBAs, none of the KBAs has a high enough irreplaceability of threatened species to qualify as high relative biodiversity value. Several of the KBAs, such as Lagunas Bravas (CHI1), Monumento Natural Salar de Surire (CHI2), and Parque Nacional Lauca (CHI3), support locally important populations of aquatic birds such as ducks and geese, puna flamingo (*Phoenicoparrus jamesi*), Andean flamingo (*Phoenicoparrus andinus*) and horned coot (*Fulica cornuta*).

A major threat to the KBAs in Chile is the direct and indirect impacts from the mining industry. One of the most important adverse effects of this activity is the use of large volumes of water. Mining operations extract water from deep underground aquifers, reducing the amount of water available for spring-fed wetlands, a scarce resource in this environment and vital to maintaining populations of the aquatic birds for which several of the KBAs were defined.

Table 4.11. KBAs in Chile

CEPF Code	KBA Name[1]	Area (ha)	Protection[2]	Corridor
CHI1	Lagunas Bravas	804	no	--
CHI2	Monumento Natural Salar de Surire	15,815	no	Chilean / Bolivian Altiplano Saline Lakes
CHI3	Parque Nacional Lauca	127,977	yes	Chilean / Bolivian Altiplano Saline Lakes
CHI4	Parque Nacional Salar de Huasco	108,221	yes	Chilean / Bolivian Altiplano Saline Lakes
CHI5	Parque Nacional Volcán Isluga	151,864	yes	Chilean / Bolivian Altiplano Saline Lakes
CHI6	Precordillera Socoroma-Putre	5,848	no	Chilean / Bolivian Altiplano Saline Lakes
CHI7	Puquios	29,446	no	Chilean / Bolivian Altiplano Saline Lakes
CHI8	Reserva Nacional Alto del Loa	32,421	no	Trinational Puna
CHI9	Reserva Nacional Las Vicuñas	100,753	no	Chilean / Bolivian Altiplano Saline Lakes
CHI10	Reserva Nacional Los Flamencos - Soncor	66,431	no	Trinational Puna
CHI11	Salar de Piedra Parada	2,715	no	--

[1] Names of KBAs that are IBAs or AZE sites are those provided by the original sources. An * denotes KBAs with high relative biodiversity value.
[2] Yes: >80% of KBA overlaps a public protected area; part: 10-80% overlap; no: <10% overlap. See section on legal protection of KBAs for further information on designations.

Relative Biodiversity Value

The relative biodiversity value of KBAs varies substantially depending on the number and range size of threatened species (Figure 4.7). For context, Figure 4.8 shows a map of relative biodiversity value throughout the hotspot.

The profile finds 92 KBAs have high relative biodiversity value (defined as those with scores greater than 0.4 and validated with records of threatened species). Appendix 5 lists the relative biodiversity values and trigger species that characterize the KBAs with high relative biodiversity value. As shown in Figure 4.7, KBAs with the highest relative biodiversity value are located in in the following areas:

- Venezuela: Cordillera de la Costa (Monumento Natural Pico Codazzi, Parque Nacional Macarao, Parque Nacional Henri Pittier);
- Colombia: Western Cordillera (Parque Natural Regional Páramo del Duende, Tatama – Paraguas, Munchique Sur, Región del Alto Calima, Enclave Seco del Río Dagua, Bosque de San Antonio/Km 18, Parque Nacional Natural Farallones de Cali, Parque Nacional Natural Munchique, Serranía del Pinche, Reserva Natural El Pangán);
- Ecuador: Eastern and western Cordilleras (Bosque Protector Los Cedros, Los Bancos-Milpe, Mindo and western foothills of Volcan Pichincha, Rio Toachi-Chiriboga, Cordillera de Huacamayos-San Isidro-Sierra Azul, Maquipucuna-Río Guayllabamba, Parque Nacional Sumaco-Napo Galeras);
- Peru: Northern (Abra Patricia - Alto Mayo, Cordillera de Colán) and southern (Kosnipata Carabaya)
- Bolivia: Cotapata.

Figure 4.7. Relative Biodiversity Value of the KBAs in the Tropical Andes Hotspot

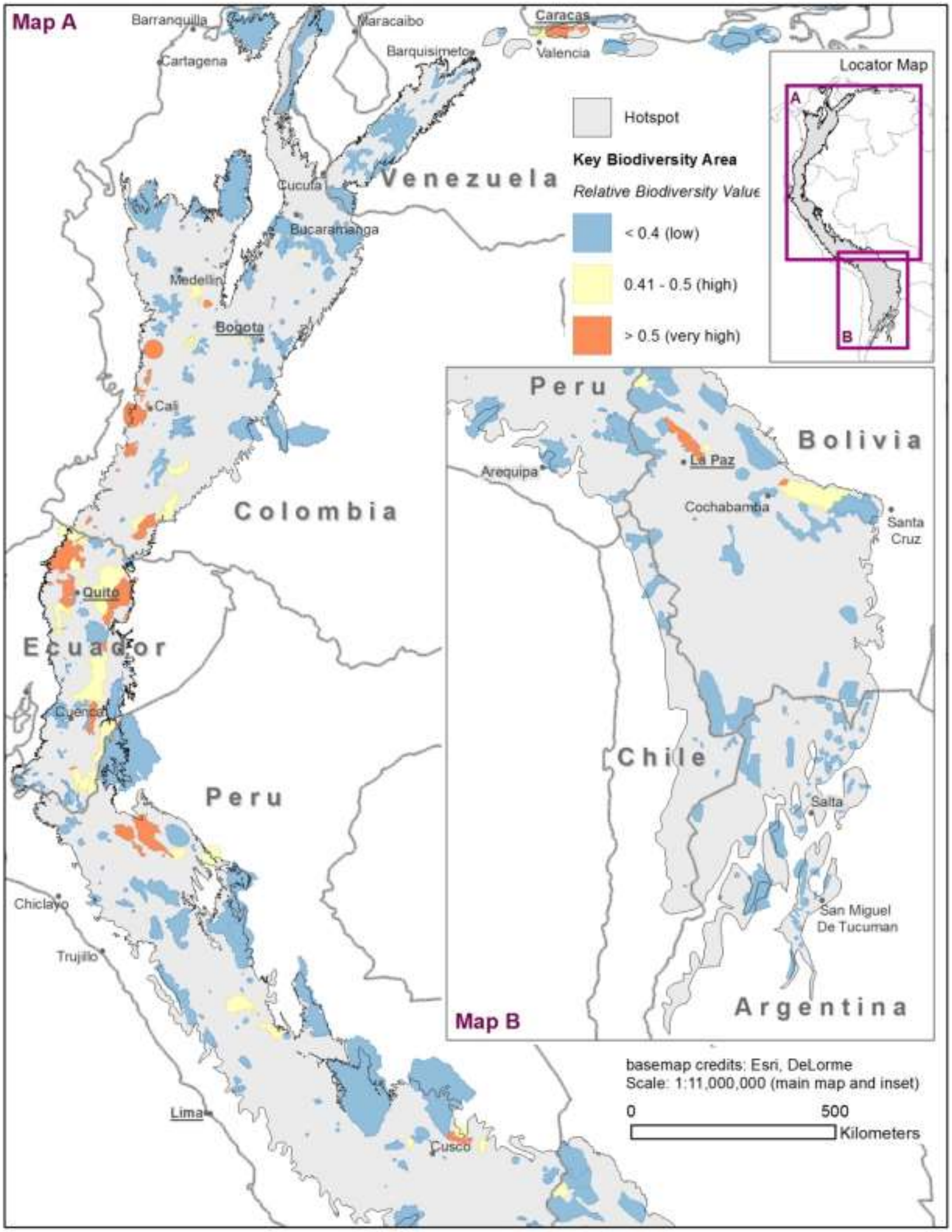
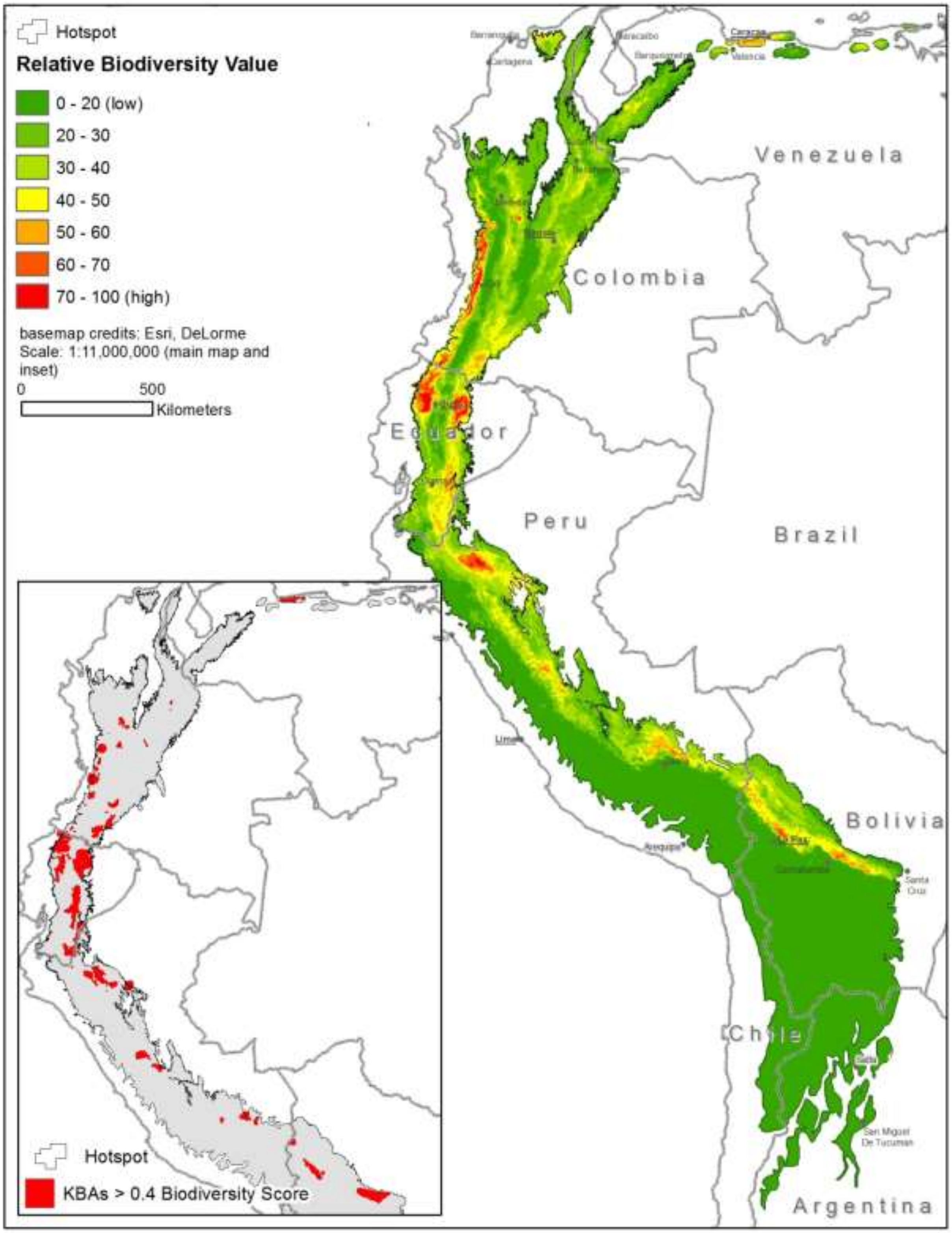


Figure 4.8. Relative Biodiversity Value in the Tropical Andes Hotspot



Legal Protection of KBAs

Andean governments, local communities, international donors and conservationists have invested tremendous effort over the decades to establish new protected areas in the Tropical Andes Hotspot. Their efforts have paid off handsomely in several respects. Across the hotspot, the profile identifies 572 protected areas with sites that have international, national or subnational designation specifically for biodiversity conservation and natural resources management. These sites cover 28.2 million hectares, or 18 percent of the hotspot's land area, an area nearly the size of Italy (see Table 4.12. and Appendix 6).[3] Within individual countries, the percent of the hotspot under protection varies from a low of 8 percent in Chile to a high of 32 percent in Argentina.

The protection status of the hotspot's KBAs and AZE sites remains a mixed picture. About 59 percent of the area falling within the borders of a KBA overlap with land designated as protected, leaving 41 percent unprotected. Of the Tropical Andes' 442 KBAs, about 46 percent or 205 sites, have at least 10 percent of their land area under some form of protection (see Table 4.13). However, only 123 sites, or 28 percent, are considered to have high protection, with at least 80 percent of their area lying within a protected area. These protected KBAs cover a little over 15 million ha, about the size of Suriname, which equals 44 percent of the total area located in a KBA. They include 30 AZE sites and 22 sites determined to have the highest biodiversity value by CEPF.

Another 82 KBAs, including 23 sites rated as having the highest biodiversity value and 23 AZE sites, have intermediate levels of protection, signifying that between 10 percent and 80 percent of their area lie within a protected area. These KBAs cover just over 9 million hectares, or 27 percent of the total area under KBA designation. The remaining 237 KBAs, 54 percent of all KBAs in the hotspot, including 63 AZE sites and 47 sites rated as having the highest biodiversity value, are not protected. These sites cover almost 10 million hectares, an area the size of Cuba.

A total of 8.6 million hectares, or 31 percent of protected areas land coverage, do not overlap with a KBA at all. These protected areas do not meet the criteria for KBA designation, suggesting that they may perform their function of preventing species from becoming endangered in the first place. Alternatively, they may be poorly surveyed by scientists and harbor undetected threatened species.

Table 4.13. KBA and AZE Sites Under Legal Protection

	Protected[1]	Partially Protected	Unprotected	Total
Number, percent of KBAs	123 (28%)	82 (18%)	237 (54%)	442
KBA area (ha),	15,064,069	9,028,999	9,818,290	33,911,358[2]

[3] Subnational protected areas are those managed at the departmental, provincial or some other local government level rather than by a national government. International categories such as World Heritage sites, Ramsar sites or Biosphere Reserves usually overlap national protected areas.

percent of total	(44%)	(27%)	(29%)	
Number, percent of high biodiversity KBAs	22 (24%)	23 (25%)	47 (51%)	92
Number, percent of AZE sites	30 (26%)	23 (20%)	63 (54%)	116

[1] Scoring: Protected: >80% of KBA overlaps a public protected area; Partially: 10-80% overlap; Unprotected: <10% overlap.
[2] Total area is slightly higher than total KBA area reported elsewhere because of partial overlapping of IBAs and AZE sites.

It is important to note that the analysis of legal protection may modestly overestimate the number of unprotected or partially protected KBAs due to the lack of comprehensive data sets for all protection modalities found in the hotspot. For example, Argentina, Bolivia, Chile and Ecuador may have small private protected areas and conservation concessions that are not captured in this analysis due to the lack of comprehensive data sets.[4] Data sets for Ecuador were particularly limited in their coverage of different kinds of protection approaches. Furthermore, some KBAs may overlap with indigenous territories or other land management designations that do not necessarily have biodiversity conservation as a management objective. For example indigenous reserves in the Andean highlands are often a form of communal land ownership that may or may not have sustainable natural resources management as an objective. These data limitations do not materially impact the overall findings of the ecosystem profile that a significant percentage of land designated as falling within KBAs, which harbor the most important globally threatened biodiversity, remains only partially protected or completely unprotected.

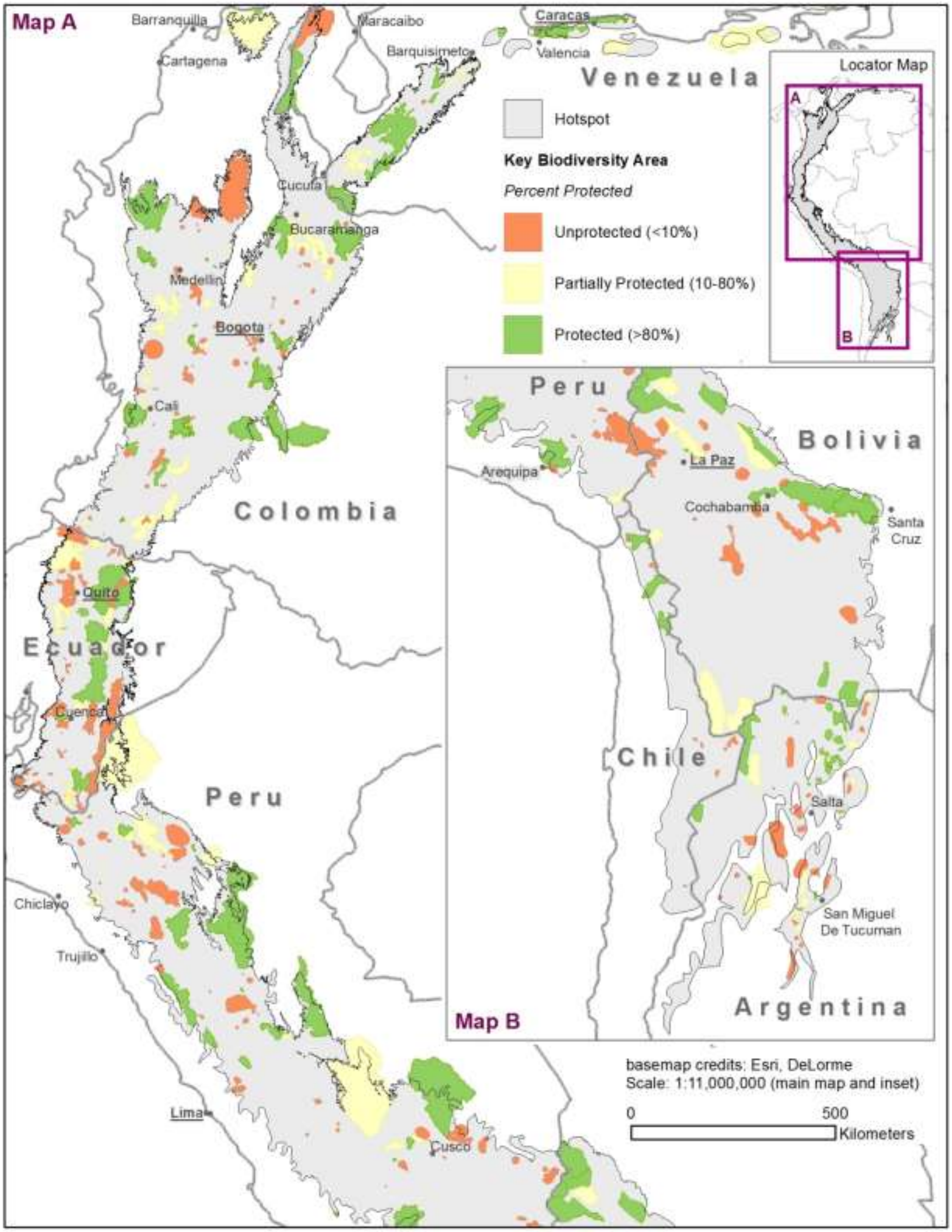
[4] The National Registry of Protected Areas from Colombia and Peru and their respective spatial data sets included areas with different types of protection regimes and levels of governance (i.e., public national and subnational, communal reserves, private reserves and conservation concessions). Argentina and Bolivia data sets included international, national and subnational level management areas, but not private or communal reserves. The Chilean data set included Ramsar sites, national parks and natural monuments, but lacked national reserves and private protected areas. Ecuador's data set only included national-level protected areas and excluded private reserves and subnational management areas. It excluded the 1 million hectares brought under private and communal land ownership since 2008 for conservation and natural cover regeneration nationwide under the Socio Bosque incentive program. Thus, the figures in this section may underestimate the level of protection of KBAs to different degrees depending on the country.

Table 4.12. Protection Areas for Biodiversity Conservation in the Tropical Andes Hotspot[1]

Protected Area Unit		**Venezuela**	**Colombia**	**Ecuador**	**Peru**	**Bolivia**	**Argentina**	**Chile**	**Tropical Andes Hotspot**
National	Number	18	77	20	48	15	17	8	**203**
	Coverage (ha)	1,800,242	3,955,774	1,783,394	5,740,362	5,616,076	3,587,167	997,380	**23,480,395**
Sub-national	Number	17	257	5	27	74	23	ND	**403**
	Coverage (ha)	214,496	1,051,146	82,434	404,991	1,088,339	1,482,676	ND	**4,324,082**
Ramsar Sites	Number	5	6	13	13	4	3	3	**47**
World Heritage Sites	Number	1	2	2	3	0	1	0	**9**
Biosphere Reserves	Number	2	5	5	4	2	4	1	**23**
Total **hotspot area** under public protection (ha)		2,014,270	4,938,842	2,288,691	6,534,394	7,085,882	4,787,522	603,140	**28,252,741**
Area within hotspot (ha)		6,952,335	35,029,005	11,786,728	45,326,993	37,000,925	14,872,815	7,384,213	**158,353,016**
% of **hotspot area** under public protection		29%	14%	19%	14%	19%	32%	8%	**18%**
% of **KBA area** under legal protection		68%	53%	51%	58%	69%	57%	79%	**59%**

[1] Includes international, national and subnational public protected areas where conservation is a major management objective. Does not include indigenous territories or other land tenure regimes where biodiversity conservation or natural resources management is not a principle objective. In Argentina, Bolivia, Chile and Ecuador, small private protected areas and conservation concessions may be excluded due to lack of official data.

Figure 4.9. Status of Public Protection of KBAs in the Tropical Andes Hotspot



Ecosystem Services of the KBAs

The KBAs of the Tropical Andes Hotspot contribute vital ecosystem services for human populations at multiple levels, providing clean water to small Andean hamlets and to major cities and agriculatural lands. At the same time, they store carbon in vast tropical forests to help regulate global carbon budgets. Of particular note are the KBAs' ecosystem services for water provision for domestic and agricultural use, carbon storage and food security, as described in this section.

Water Provision for Domestic Use

An assessment of KBA water provision services analyzes the water availability juxtaposed with downstream human populations. Water provisioning also reflects the hotspot's highly variable climates and rainfall patterns, as detailed in Chapter 3. As Figure 4.10 shows, the KBAs of highest importance for providing the greatest amount of high-quality water for domestic consumption tended to be located along northern and western slopes of the Andes Mountains, within pockets of locally important KBAs for medium-sized cities in the inter-Andean valley.[5] Lower ranking KBAs are located along the eastern Andean-Amazonian slope, particularly in the south. Table 4.14 shows that only 50 KBAs out of the 429 sites assessed received a high or medium ranking, or about 12 percent of all KBAs, for water provision for domestic use.

Table 4.14. KBA Rating for Importance of Water Provision for Domestic Use, Number of KBAs

Country	**Level of Importance**		
	High	**Medium**	**Low**
Argentina			65
Bolivia			38
Chile			8
Colombia	1	4	115
Ecuador		18	59
Peru	4	11	79
Venezuela	6	6	15
Total	**11**	**39**	**379**

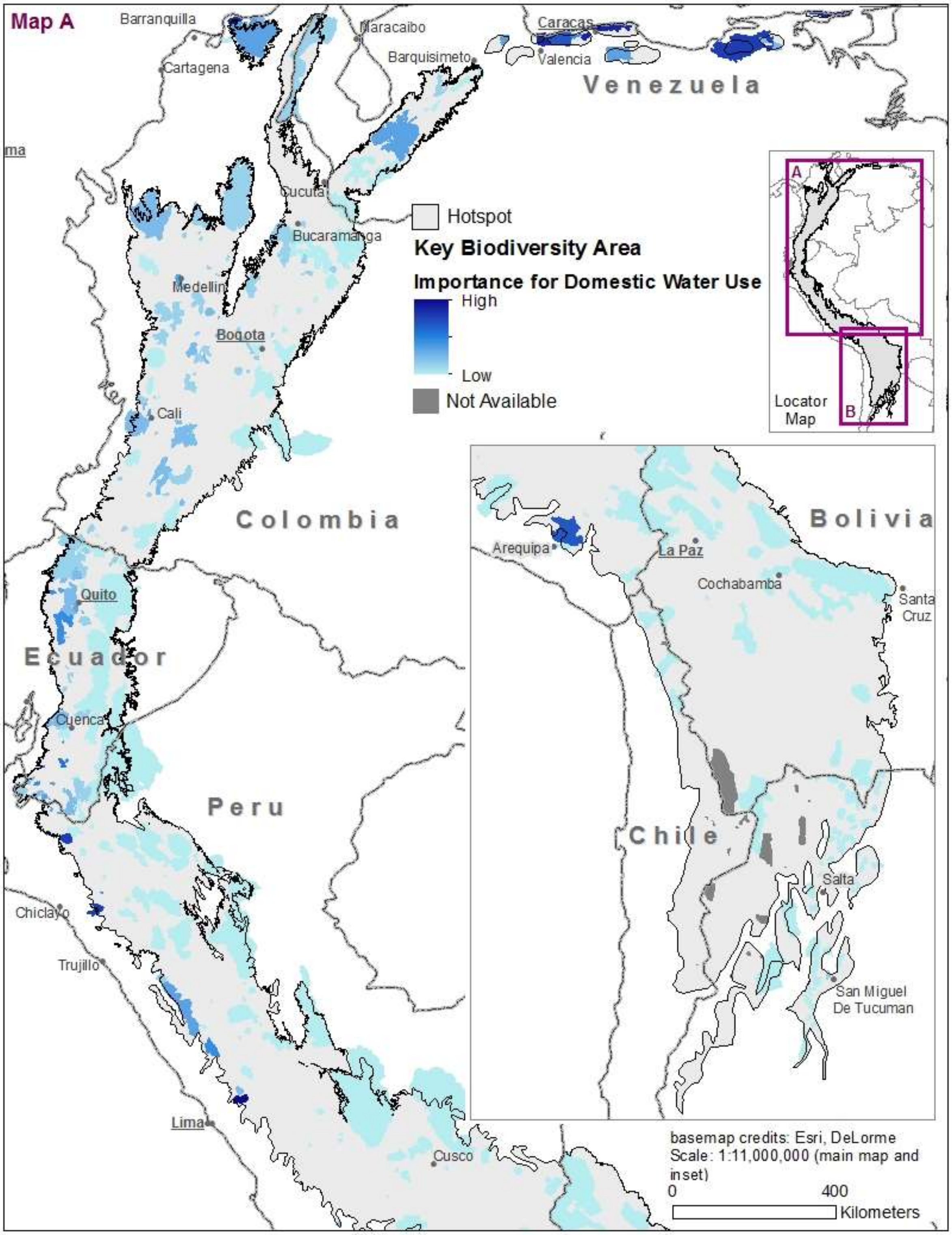
Water Provision Score: High > 10; Medium 1 to 10; Low < 1

In Venezuela, four high-ranking KBAs—Parque Nacional Macarao, El Avila National Park and surrounding areas, Peninsula de Paria National Park, and Zona Protectora Macizo Montañoso del Turimiquire—supply all the water for the 3.4 million residents of Caracas. In Colombia, the Sierra Nevada de Santa Marta provides large amounts of water to Caribbean coastal cities. More than 10 of Ecuador's medium-ranking KBAs provide water to the 2.5 million people who live in the cities of Quito and Cuenca. And in Peru, Alto Valle Santa Eulalia-Milloc and Pampas Pucacocha y Curicocha are important in providing water for Lima and its 7 million inhabitants.

[5] The analysis of water provisioning for domestic use reflects cumulative downstream human population (LandScan 2007) and the ratio of the annual water balance to total runoff (Mulligan 2010).

The Reserva Nacional Salinas y Aguada Blanca is an important source of water for the nearly 1 million people of Arequipa.

Figure 4.10. Provisioning by KBAs of Water for Domestic Use in the Tropical Andes Hotspot



Water Provision for Agricultural Use

KBA water provision services for agricultural use reflect those sites with high relative water balance juxtaposed with important downstream agricultural zones.[6] Figure 4.11 shows a similar geographic pattern for water provising for agriculture as that found for domestic use. High-ranking KBAs that provide significant quantities of water for agriculture are located on the western and northern slopes of the Andes, while medium-ranking KBAs tend to be more disbursed throughout the inter-Andean valley. Lower ranking KBAs are located along the eastern Andean slope, particularly in the south. Table 4.15 shows that only 60 KBAs out of the 429 sites assessed received a high or medium ranking for agricultural use, or about 14 percent of all KBAs.

Table 4.15. KBA Rating for Importance of Water Provision for Agriculture, Number of KBAs

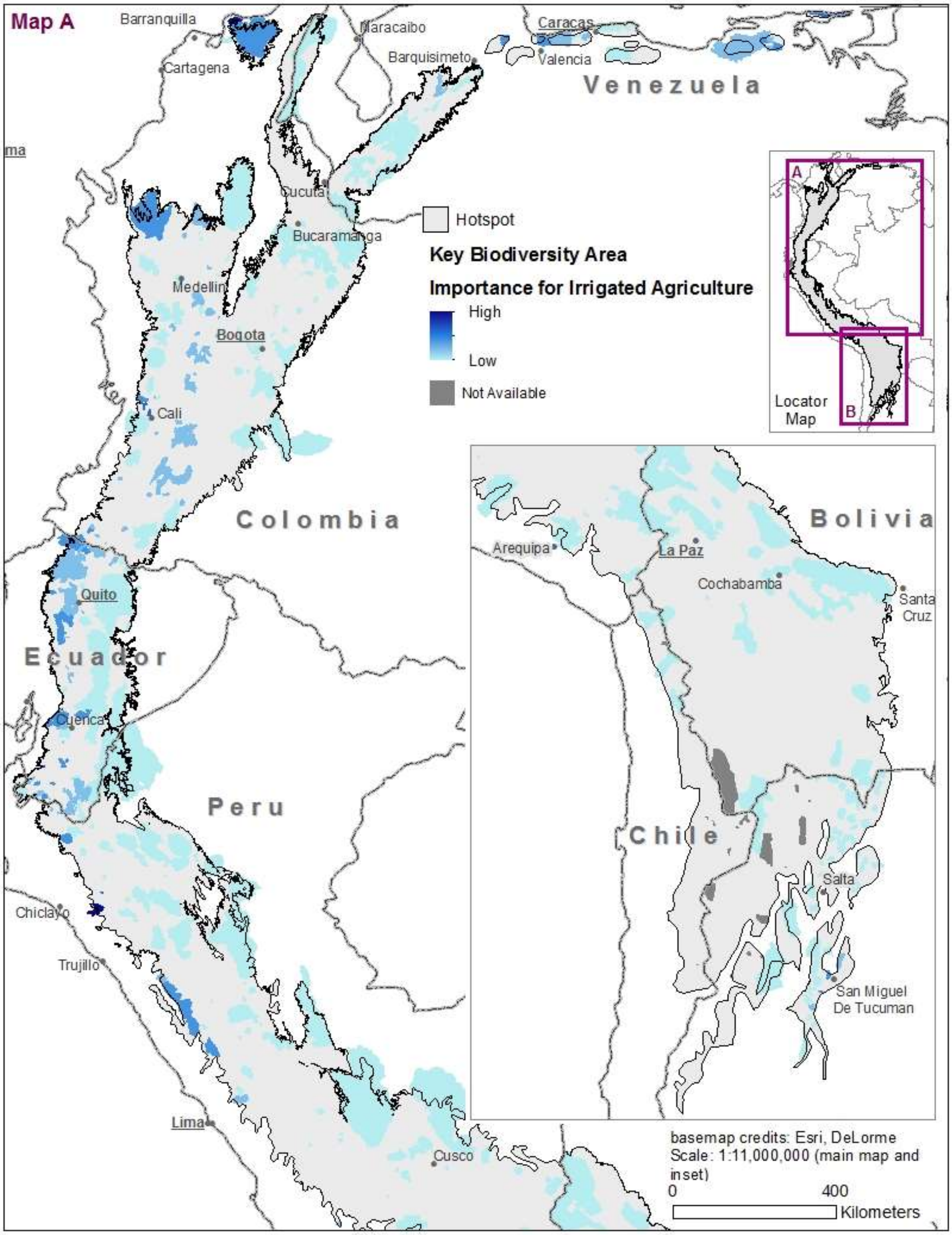
Country	High	Medium	Low
Argentina		3	62
Bolivia			38
Chile			8
Colombia	3	12	105
Ecuador	3	26	48
Peru	2	8	84
Venezuela	1	5	21
Total	**9**	**54**	**366**

Water Provision Score: High > 10; Medium 1 to 10; Low < 1

In Venezuela, the Peninsula de Paria National Park emerged as having high importance for downstream agricultural areas to the south. In Colombia, the Sierra Nevada de Santa Marta and the adjacent Granjas del Padre Luna KBA provide water for the agricultural areas to the southeast in the Valledupar region and to the west around Aracataca, the birthplace of Gabriel García Marquez and the inspiration for his great literary work, *One Hundred Years of Solitude*, which describes life on a banana plantation. At the northern terminus of the Cordillera Occidental in Colombia, the Parque Nacional Natural Paramillo provides water for important corn, cotton and rice production in the Sinú River Valley of the Department of Córdoba. Bosque de San Antonio and Enclave Seco del Río Dagua are located northwest of Cali in a region of high agricultural use. In Ecuador's northwest corner and by Cuenca, more than 10 KBAs provide water to rich agricultural lands of the inter-Andean valley. KBAs in northwestern Peru protect water sources for agriculture in the otherwise dry Chiclayo and Piura provinces.

[6] Water provisioning for agricultural uses was calculated as for domestic use except that data representing area and yield of irrigable crops (Monfreda *et al*., 2008; Ramankutty *et al*., 2008) substituted the human population data.

Figure 4.11. Provisioning by KBAs of Water for Agricultural Use in the Tropical Andes Hotspot



Carbon Storage

The KBAs of the Tropical Andes collectively store more than 5.4 billion tonnes of carbon, which is equivalent to the amount of carbon emitted by 1 billion cars in one year, a significant volume with respect to the regulation of global carbon budgets.

The amount of carbon stored in each KBA varies substantially depending on its vegetation. KBAs dominated by highland páramos, puna grasslands or shrubs have a smaller standing carbon biomass per unit area than KBAs dominated by high canopy forests. KBAs in Colombia, Ecuador and Peru average more than 200 metric tonnes of carbon per hectare (Table 4.16),[7] reflecting the dominance of forested habitats in these areas. KBAs in Bolivia have a wide range of carbon storage values (averaging nearly 120 tonnes per hectare), reflecting its mix of forested and puna habitats. Carbon storage is lowest in Chile and Argentina, where KBAs are characterized more by shrublands and deserts than by forests. The KBAs with the highest mean carbon storage are in Bolivia (Yungas Inferiores de Madidi, Cristal Mayu y Alrededores, Yungas Inferiores de Pilón Lajas, Yungas Inferiores de Isiboro-Sécure/Altamachi) and in Peru (Abra Tangarana, Mina Inca, Reserva Comunal El Sira, Llamaquizú stream, Cordillera del Cóndor, Parque Nacional Tingo María, and Parque Nacional Cordillera Azul). These KBAs all average 280 to 299 tonnes of carbon per hectare.

The KBAs in Peru store the most carbon out of all Andean countries, almost 2 billion tonnes of carbon, reflecting the large extensions of Peru's KBAs and the large amounts of carbon stored in each. Colombia follows Peru, followed by Bolivia.

Table 4.16. Estimated Carbon Storage in KBAs of the Tropical Andes Hotspot

Country	KBA Area (ha)	Average Carbon Stored in KBAs (tonnes/ha)	Total Carbon Stored in KBAs (tonnes)	Percent of Total Carbon Stored in Hotspot KBAs
Argentina	2,020,943	33.66	68,018,313	1
Bolivia	8,480,276	119.29	1,011,653,677	19
Chile	611,104	12.27	7,500,373	0.1
Colombia	6,489,194	204.98	1,330,131,625	25
Ecuador	4,093,960	205.50	841,288,720	16
Peru	9,008,359	214.40	1,931,413,790	36
Venezuela	2,545,570	93.30	237,511,583	4
Hotspot total	33,249,406	163.2	5,427,518,081	100

Source: Saatchi *et al*. 2011

[7]Calculated from 1-km^2 resolution data from Saatchi et al. 2011 for the entire area of KBAs including portions that extend outside of the hotspot. To calculate carbon sequestration for the KBAs in the hotspot, the carbon data summarized in Table 4.15 was multiplied for each KBA by the national rate of deforestation within the hotspot area. Annual deforestation was calculated for the hotspot area of each country using data on the total forest cover for 2000 (from Hansen *et al*. 2013; defined as 30-m pixels with a tree canopy cover of greater than 50%) and forest loss from 2000-2012, Hansen *et al*. 2013).

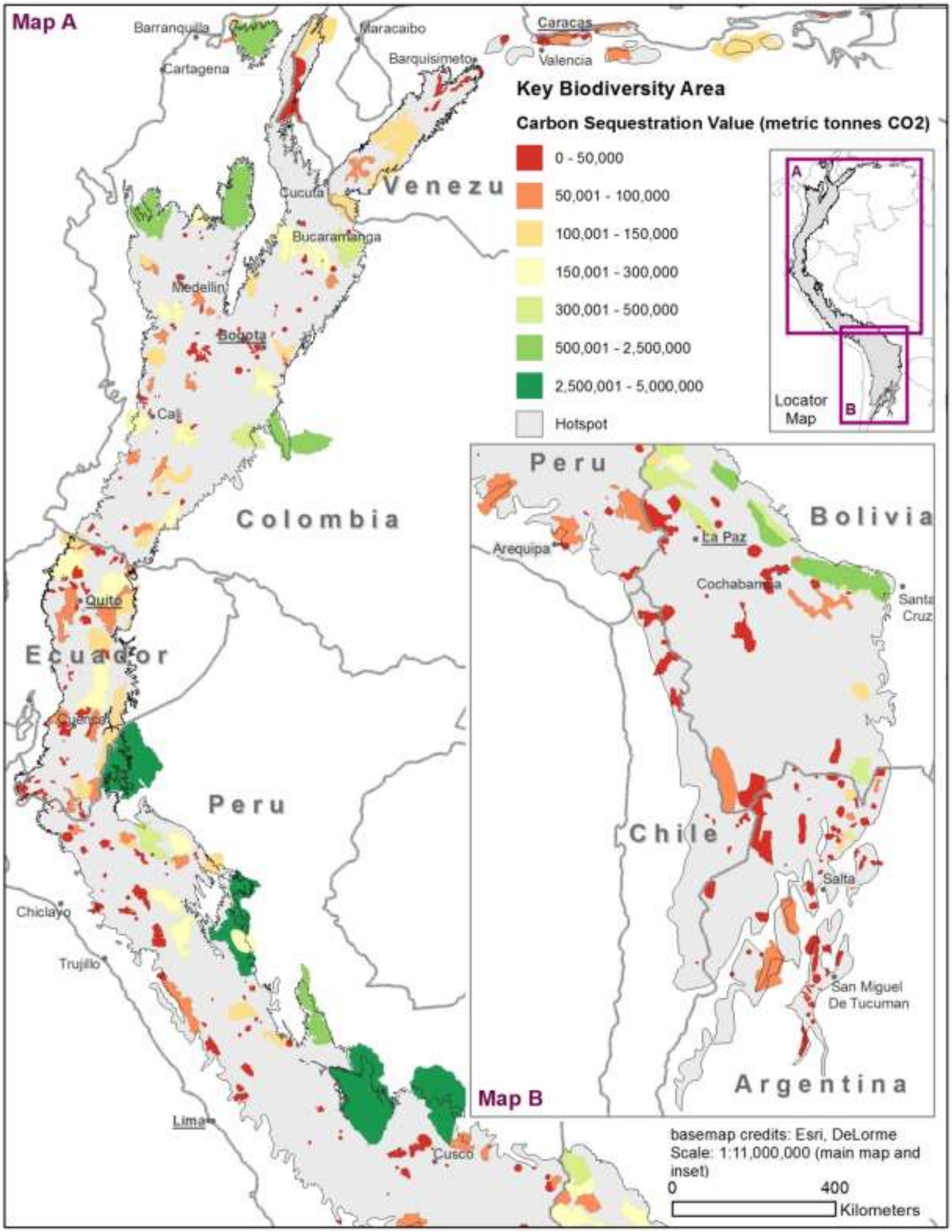
In the context of REDD+ funding mechanisms, described in detail in Chapter 9, reduced deforestation is a more important measure for carbon ecosystem services than total carbon. Reduced deforestation, or carbon sequestration, is calculated as the product of total carbon in an area and the deforestation rate. Table 4.17 shows that 108 KBAs of the 429 sites assessed, equaling 25 percent, were rated as medium or high in their carbon sequestration value, storing more than 100,000 metric tonnes of carbon. Figure 4.14 shows that these higher valued KBAs are located on the east slope of the Andes, in northern Colombia and in the Cordillera de la Costa in Venezuela. Small KBAs and those dominated by puna tend to have lower sequestration rates. The Hansen *et al*. (2013) data indicate that Ecuador has lower deforestation than most of the other countries in the hotspot (see Chapter 8) and therefore tends to have somewhat lower sequestration values than elsewhere, although other estimates, such as those made by the Food and Agricultural Organization (FAO), indicated that the deforestation rate is higher.

Table 4.17. KBA Rating for Importance for Carbon Sequestration, Number of KBAs

Country	**High**	**Medium**	**Low**
Argentina		2	63
Bolivia	7	10	21
Chile			8
Colombia	10	26	84
Ecuador	1	17	59
Peru	9	13	72
Venezuela		13	14
Total	**27**	**81**	**321**

Carbon Sequestration rating based on metric tonnes of CO_2:
High > 500,000; Medium 100,000 to 500,000; Low < 100,000.

Figure 4.14. Estimated Carbon Sequestration in KBAs in the Tropical Andes Hotspot



Food Security

Tropical Andes KBAs contain ecosystem services that have the potential to serve as sources of food or non-timber forest products (NTFPs) to local communities living near them. Table 4.18 finds that 226 KBAs of the 429 sites assessed, or 53 percent, rank medium to high for their potential to provide food and NTFP services to food-insecure people living within 10 kilometers of their border.[8] These high-ranking KBAs contain natural ecosystems in close proximity to large population centers, particularly those with high rates of poverty and child malnutrition.

Table 4.18. KBA Rating for Potential Services to Food Insecure People, Number of KBAs

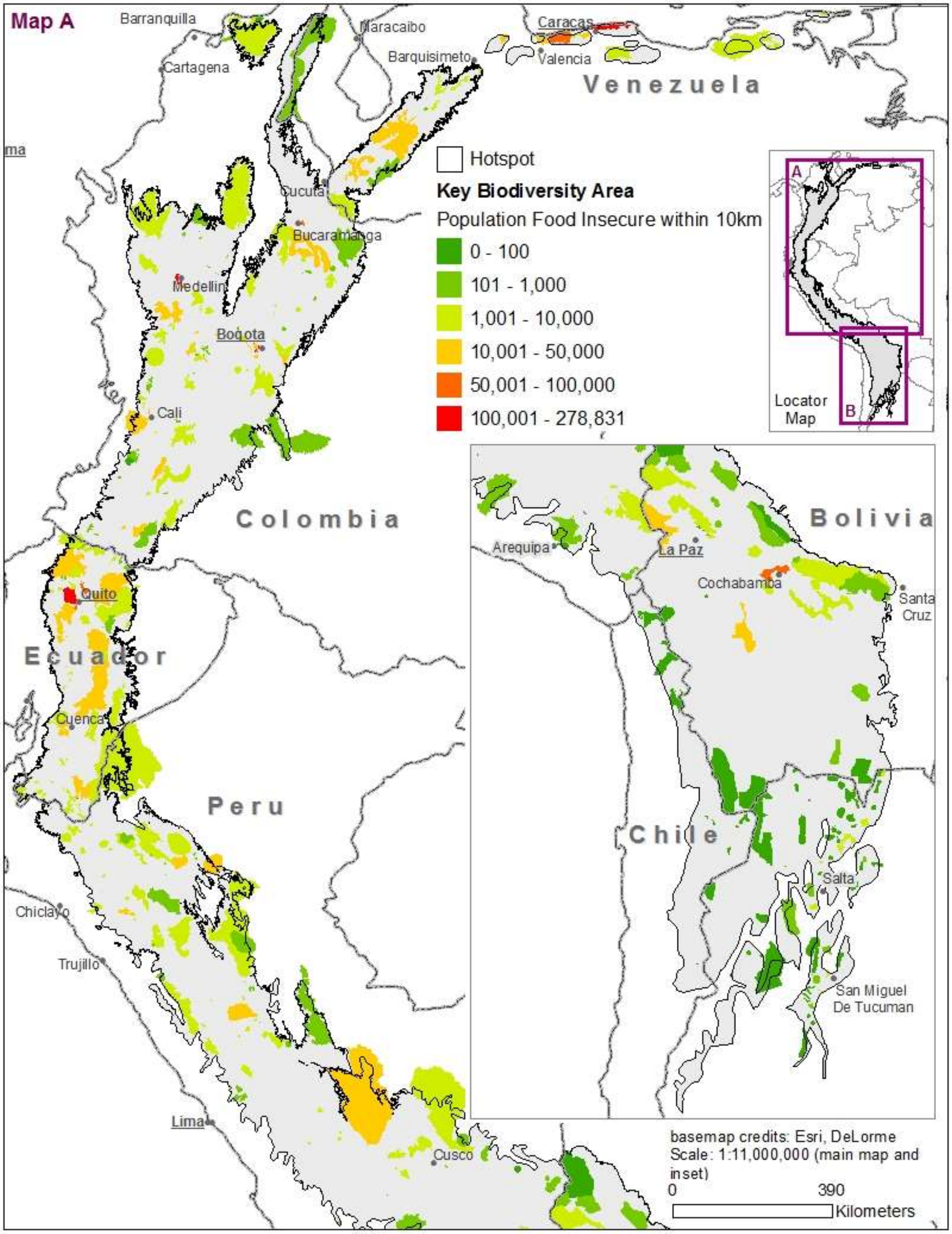
Country	High	Medium	Low
Argentina		8	57
Bolivia	1	13	24
Chile			8
Colombia	4	62	54
Ecuador	3	59	15
Peru		53	41
Venezuela	3	20	4
Total	**11**	**215**	**203**

Food Provision Rating: High> 50,000 food insecure within 10km; Medium = 1,000-50,000 food insecure within 10km; low < 1000 food insecure within 10km

Figure 4.15 highlights the importance of KBAs near inter-Andean valleys where the major population centers of the hotspot are located for potential food provision. In Venezuela, two KBAs—El Avila and Henri Pittier national parks and their surrounding areas—are close to the cities of Caracas and Valencia. In Colombia, the KBAs Cerro de Pan de Azúcar, Cerro La Judía and Humedales de la Sabana de Bogotá are located near the cities of Bogotá, Medellín and Bucaramanga. In Ecuador, two high-ranking KBAs are particularly close to Quito—Mindo and western foothills of Volcan Pichincha and Valle de Guayllabamba. And in Bolivia, the Vertiente Sur del Parque Nacional Tunar is close to Cochabamba. KBAs on the Amazonian slope of the Andes and in the southern portion of the hotspot, where population density is low, tend to be less important for their potential to provide sustenance to food-insecure populations.

[8] Summing the population of food-insecure people (estimated by the product of total population and rate of child nutrition; CIESIN 2005) provided a measure of the food provisioning value of the KBAs.

Figure 4.15. Estimated Food-Insecure Population Living Near Each KBA in the Tropical Andes Hotspot



4.3 Corridor Outcomes

Much of the Tropical Andes consists of roughly parallel mountain ranges separated by valleys that have been largely transformed into urban and agricultural landscapes. This geography limits the delineation of corridors largely to areas along the mountain ranges. The KBAs are mostly located in the mountain ranges, distributed on both the eastern and western slopes of the Andes. Within this natural geographical constraint, corridor outcomes were defined to accomplish three objectives: to provide connectivity between KBAs with similar species, species irreplaceability and habitats; to group KBAs that provide ecosystem services to the same population centers; and to provide for the needs of wide-ranging landscape species.

Identifying groups of KBAs with similar habitats and species as corridors serves to provide sufficient area with natural habitat cover and altitudinal gradients to facilitate exchange of individuals between populations to enhance persistence and maintain genetic diversity. The shared socio-political context of these landscapes also allows for coherent and coordinated conservation strategies. Considering the high value of ecosystem services provided by the KBAs, especially water provisioning, it was also important to delineate corridors that maintain catchments for areas of high population density and agricultural productivity.

In the Tropical Andes, the majority of trigger species are amphibians, birds, small mammals and plants that naturally inhabit relatively small habitat patches. The hotspot has a few threatened landscape species, such as the spectacled bear, mountain tapir and a deer relative called the northern pudu (*Pudu mephistophiles*), that have large longitudinal distributions along the mountain ranges. The configuration of the ranges of these landscape species required identifying corridors that maintain north-south connectivity along the Andean cordilleras, and the location of KBAs along these cordilleras led to most KBAs being contained within a corridor. A few isolated KBAs, such as those in dry habitats on the Eastern Cordillera of the Andes in Peru, fall outside of designated corridors.

Corridors that today encompass a broad diversity of climate regimes provide more regional-scale opportunities for species to track suitable climates as they move across the landscape than corridors with less diverse climates. To understand how resilient the corridors may be to climate change, a spatial analysis was performed to score the corridors for regional climate change vulnerability. The score considers for each corridor the number of bioclimates as defined and mapped globally by Metzger *et al.* (2013). This climate model, summarized to a 1-km^2 spatial resolution, describes major temperature and precipitation gradients. The diversity of combinations of these parameters (calculated using the Simpson Diversity Index) provides an indication of regional bioclimatic diversity, since a higher diversity is considered an advantage in terms of adaptation to climate change.

The corridor selection criteria (connectivity for KBAs with similar species and habitats, provisioning of ecosystem services for specific population centers and linkages for wide-ranging species) led to the identification of 29 corridors, including 22 that are restricted to a single country, seven binational corridors and one tri-national corridor (Tables 4.19 and 4.20, Figure

4.16). Of the 442 KBAs in the hotspot, 303 KBAs are included in a corridor. Corridor affiliation of individual KBAs is listed in Tables 4.1-4.6. Twenty of the 29 corridors contain at least one KBA that has high relative biodiversity value.

Table 4.19. Summary of Corridor Outcomes for the Tropical Andes Hotspot

	Number of corridors (number shared with another country)	Tropical Andes Hotspot area (ha)	Corridor area (ha)	Percent of hotspot covered by corridors
Argentina	3 (2)	14,872,815	3,800,095	26%
Bolivia	5 (4)	37,000,926	15,959,702	43%
Chile	2 (2)	7,384,213	2,705,371	37%
Colombia	11 (3)	35,029,005	12,135,151	35%
Ecuador	7 (3)	11,786,728	6,500,948	55%
Peru	9 (3)	45,326,993	9,418,650	21%
Venezuela	3 (1)	6,952,335	4,204,357	60%
Tropical Andes	**29**	**158,353,016**	**54,725,186**	**35%**

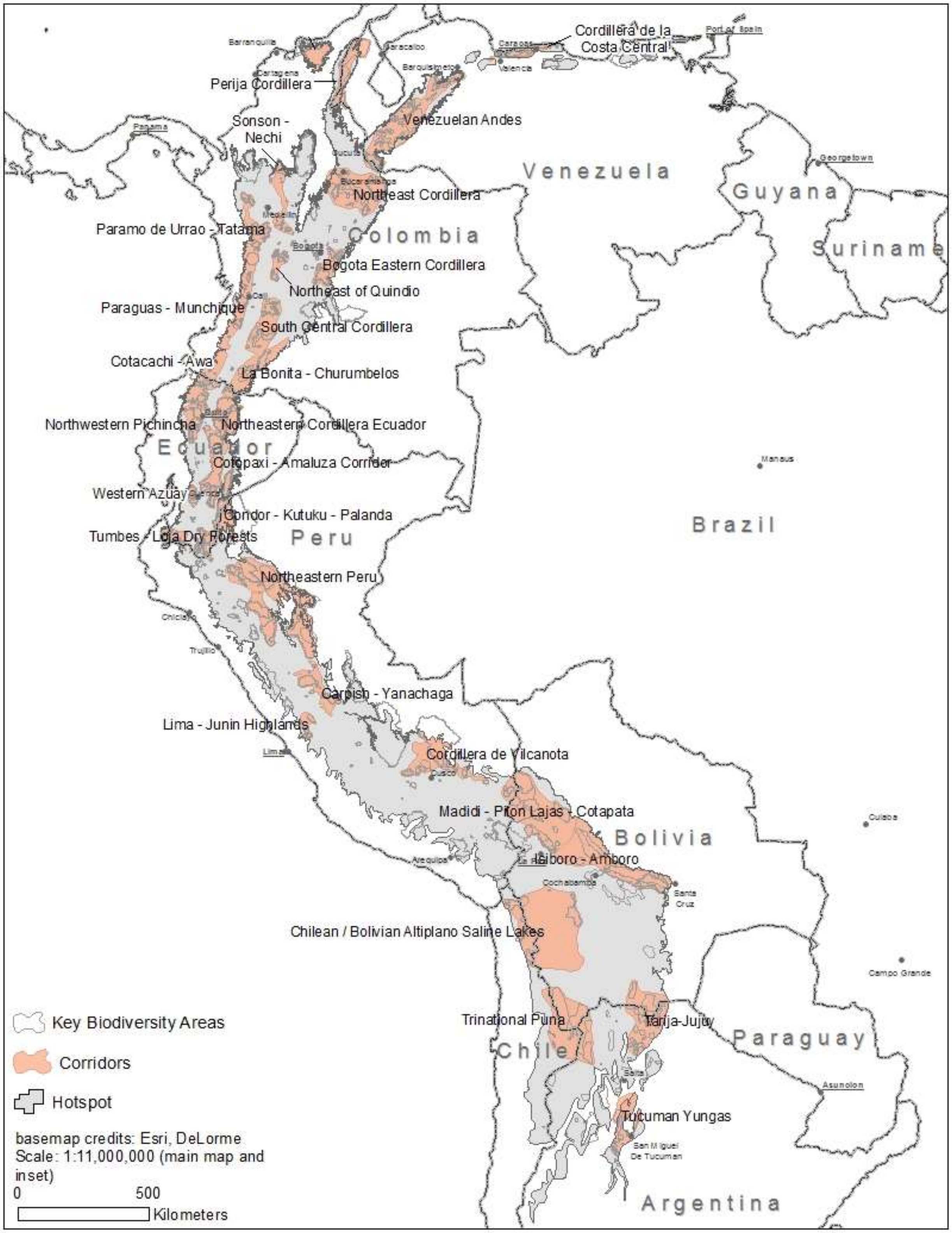
Table 4.20. Characteristics of Corridors in the Tropical Andes Hotspot

Corridor Name[1]	Country	No. of KBAs	Total Area (ha)	Percent of area protec-ted
Tucuman Yungas	Argentina	14	1,093,758	23%
Tarija-Jujuy	Argentina/Bolivia	22	2,844,453	50%
Madidi-Pilón Lajas-Cotapata*	Bolivia/Peru	19	4,620,196	43%
Isoboro-Amboro*	Bolivia	10	3,352,619	61%
Chilean / Bolivian Altiplano Saline Lakes	Bolivia/Chile	13	6,780,897	8%
Trinational Puna	Chile/Argentina/ Bolivia	6	3,723,383	34%
Northeast Cordillera*	Colombia	13	2,781,271	31%
Bogota Eastern Cordillera	Colombia	6	872,021	42%
South Central Cordillera*	Colombia	10	1,641,149	19%
La Bonita-Churumbelos*	Colombia	7	1,518,496	21%
Northeast of Quindio*	Colombia	14	455,066	23%
Sonson-Nechi*	Colombia	9	893,807	3%
Páramo de Urrao-Tatama*	Colombia	8	930,393	22%
Paraguas-Munchique*	Colombia	13	1,489,891	17%
Sierra Nevada de Santa Marta National Natural Park and surrounding areas*	Colombia	1	652,714	76%

Corridor Name[1]	Country	No. of KBAs	Total Area (ha)	Percent of area protec-ted
Cotacachi-Awa*	Colombia/Ecuador	11	1,403,038	19%
Northwestern Pichincha*	Ecuador	13	830,894	18%
Northeastern Cordillera Ecuador*	Ecuador	8	1,210,229	62%
Cotopaxi-Amaluza *	Ecuador	10	1,602,844	49%
Western Azuay	Ecuador	7	282,635	11%
Condor-Kutuku-Palanda*	Ecuador/Peru	13	1,781,100	18%
Tumbes-Loja Dry Forests	Ecuador/Peru	10	434,266	14%
Northeastern Peru*	Peru	16	4,772,667	35%
Carpish-Yanachaga*	Peru	11	1,109,275	13%
Lima-Junin Highlands	Peru	3	101,220	0%
Cordillera de Vilcanota*	Peru	12	2,121,228	40%
Venezuelan Andes	Venezuela	14	3,204,076	40%
Perija Cordillera	Venezuela/Colombia	4	986,370	37%
Cordillera de la Costa Central*	Venezuela	6	374,697	58%

[1] * denotes corridors that include high relative biodiversity value KBAs.

Figure 4.16. Corridors Identified for the Tropical Andes Hotspot



5. SOCIOECONOMIC CONTEXT OF THE HOTSPOT

The Tropical Andes are undergoing significant economic and demographic changes. Extractive industries are increasing their share of the region's economies, and there are substantial human migrations taking place. This chapter provides an overview of this socioeconomic context and how it relates to biodiversity conservation. The chapter presents a synopsis of the region's rich human history, describes the contemporary population and reviews recent demographic, development and land use trends and the principal economic sectors and trends operating in the region. Information provided in this chapter is based a review of current published and unpublished literature and complemented by information obtained during national workshops and through interviews with key stakeholders across the region.

5.1 Population Overview

The seven Andean countries that overlap the hotspot are predominantly populated by Spanish-speaking *mestizos* or people of mixed indigenous and Spanish heritage. A great diversity of indigenous cultures persists in the Andes of the 21st Century as a result of the richness and cultural strength and pride born from the ancient civilizations of the region. Descendants of black African slaves brought by the Spanish during their conquest of present-day Colombia, Ecuador, Peru and Bolivia to a lesser extent, also contribute to the multi-ethnic composition of contemporary Andean countries.

Human populations in the Andes have followed the global trend towards urbanization. From a socioeconomic perspective, this trend has, in many cases, increased education and job opportunities and improved income of marginalized groups. In some cases, urbanization has also increased the vulnerability of some people, for example those forced to live in precarious situations on steep, unstable slopes on the outskirts of Andean cities (Roberts 2009). From a perspective of environmental conservation, this rural to urban pattern of human migration may present opportunities such as reducing the rate of advancement of the agricultural frontier in biologically sensitive areas. It also creates risks such as increasing the demand for natural resources for growing urban markets and accelerating construction, mining and other extractive activities that have boom and bust economic cycles and that usually create severe negative impacts on the environment.

Internal population redistribution in Andean countries has increased competition for land and water. In mountainous areas in particular, growing cities put increasing stress on soil and water resources due to deforestation, erosion and landslides that are common in steep areas (Buytaert and De Bièvre 2012). Some of the region's largest cities are located within the hotspot, such as the capital cities of Caracas, Bogotá, Quito and La Paz while other cities, such as Lima and Santa Cruz, are outside of the hotspot but completely dependent on water emanating from it to supply large urban populations. Cities located in the hotspot that are among the most important administrative or economic centers for trade (*e.g.,* Popayán, Ibarra, El Alto, Juliaca, Huancayo), industry (*e.g.,* Medellin, Bogota, Quito), mining (*e.g.,* Potosí, Bucaramanga, San Pedro de Atacama, Juliaca) or tourism (*e.g.,* Cuzco, Quito, Baños, Cuenca, Armenia, Medellin, Merida, Jujuy) are listed in Table 5.1. These cities are highlighted as geographical jumping off points for

CEPF investment for specific KBAs as well as local partnership development (government and CSO) and strategic financing with other institutions and projects.

Table 5.1. Important Cities in the Hotspot, with Elevation, Population and Relevance to KBAs

Country	City	Elevation (m)	Population	Nearby KBAs and Corridors
Argentina	Jujuy	1,259	238,000	Tiraxi y Las Capillas, Yala
	Salta	1,152	535,303	Quebrada El Toro, Cerro Negro de San Antonio
	San Miguel de Tucumán	500	549,163	Valley of Tafi, Sierra de San Javier, Reserva Natural de La Angostura
Bolivia	Cochabamba	2,558	1,938,401	Cristal Mayu, Yungas Superiores de Carrasco
	El Alto	4,150	974,754	Valle La Paz
	La Paz	3,640	900,000	Cotapata, Zongo Valley
	Potosí	4,067	240,996	--
	Tarija	1,854	234,442	Tarija-Jujuy corridor
Chile	San Pedro de Atacama	2,407	3,899	Chilean/ Bolivian Altiplano Saline Lakes corridor
Colombia	Armenia	1,551	292,000	Cañón del Río Barbas y Bremen, Finca la Betulia Reserva la Patasola
	Bogotá	2,625	7,674,366	Bosques de la Falla del Tequendama, Fusagasuga, Granjas de Padre Luna, Humedales de la Sabana de Bogotá
	Bucaramanga	959	530,900	Cerro La Judía
	Cali	997	2,400,653	Bosque de San Antonio/Km 18, Enclave Seco del Río Dagua, PNN Farallones de Cali, Región del Alto Calima
	Ibagué	1,248	517 857	--
	Manizales	2,160	450,000	Bosques del Oriente de Risaralda, Reserva Río Blanco
	Medellin	1,495	2,499,080	Cerro de Pan de Azúcar, San Sebastián
	Pereira	1,411	467,000	Albania, Bosques del Oriente de Risaralda, Cañón del Río Barbas y Bremen, Finca la Betulia Reserva la Patasola
	Popayán	1,760	270,000	PNN Puracé, Puracé, Serranía de las Minas
Ecuador	Baños	1,815	10,000	CE Llanganates-Sangay
	Cuenca	2,560	331,888	Agua Rica
	Ibarra	2,225	132,977	RE Cotacachi-Cayapas, Intag-Toisán, Bosque Protector Los Cedros, Territorio Awá
	Loja	2,060	185,000	PN Podocarpus, Abra de Zamora, Amaluza
	Quito	2,850	2,239,191	PN Sumaco-Galeras, Rio Toachi-Chiriboga, Cord. de Huacamayos, Maquipucuna-Río Guayllabamba, Río Caoni, Los Bancos-Milpe, Mindo-Estribaciones Occidentales Pichincha
Peru	Arequipa	2,335	947,384	Chiguata, Reserva Nacional Salinas y Aguada Blanca
	Cajamarca	2,750	283,767	San José de Lourdes
	Chachapoyas	2,235	20,279	Río Utcubamba, 7 km East of Chachapoyas

Country	City	Elevation (m)	Population	Nearby KBAs and Corridors
	Cuzco	3,399	358,935	Kosnipata-Carabaya, Ocobamba-Cord. Vilcanota
	Huancayo	3,259	380,000	Río Mantaro-Cordillera Central
	Juliaca	3,825	225,146	Carabaya
	Moyobamba	860	140,299	Cord. de Colán, Abra Patricia-Alto Mayo, Abra Pardo Miguel
Venezuela	Caracas	900	2,104,000	PN Henri Pittier, PN Macarao, MN Pico Codazzi
	Mérida	1,600	317,410	Sierra La Culata and Sierra Nevada National Parks and surrounding areas

5.2 A Brief Human History of the Hotspot

Human occupation in the hotspot dates back 13,000-19,000 years (Fuselli *et al.* 2003). This lengthy presence contributed to the domestication of many plant and animal species, turning the Tropical Andes into one of the world's 12 major centers of origin of plants cultivated for food, medicine and industry (Saavedra and Freese 1986). Pre-Columbian cultures in the central Andes include the Chavin, Moche, Tiwanaku, Cañari, Muisca and Incan civilizations (Table 5.2). All of these ancient Andean civilizations managed their landscapes by building irrigation systems and the later ones developed extensive terraced agriculture that supported crop production during seasonal dry periods that had a major impact on the natural environment. Terracing appears to have been part of an economic strategy for food security that has important implications for adaptation to climate change that is facing the region today (Kendall and Chepstow-Lusty 2006).

Table 5.2. Timescale and Description of Important Ancient Andean Civilizations

Civilization	Time Period	Location	Brief Description
Chavin	900 -200 BC	Northern Andes of Peru	Chavin was the earliest highly developed culture in the region. Sedentary agriculture was established and potatoes, quinoa, and maize were cultivated using an irrigation system. Llamas and alpacas were used for pack animals, fiber and meat, and weaving, pottery and stone carving crafts were developed.
Moche	100-800 AD	Northern Peru	Moche society was agriculturally based using irrigation canals to divert river water to supply crops. Their culture was sophisticated and their artifacts expressed their lives, with detailed scenes of hunting, fishing, fighting, sacrifice, sexual encounters and elaborate ceremonies.
Tiwanaku	550-950 AD	Southern Peru, Bolivia, Northern Chile and Argentina	Living at high altitude, the Tiwanaku used raised-field systems to grow frost-resistant crops such as potatoes and quinoa. Llamas carried corn and other trade goods up from lower elevations. The Tiwanaku had large herds of domesticated alpaca and llama, and hunted wild guanaco and vicugna (*Vicugna vicugna*).
Cañari	500-1533 AD	Southern Ecuador	The Cañari are particularly noted for their resistance against the Inca domain as it aimed to extend northwards into Ecuador. Eventually conquered by the Inca shortly before the arrival of the Spanish, Cañari warriors later accompanied the Spanish against the Inca.
Muisca	1000-1533 AD	Eastern Cordillera of Colombia	The Muisca were raised-field farmers who built stone monuments and excelled at metalworking. When the Spaniards arrived, they found the Muisca controlling mines of emeralds, copper, coal, salt and gold.
Inca	1400-1533 AD	Andes of Southern Colombia to northern Chile and Argentina	The Inca Empire – known as Tawantinsuyo (four lands) - was the largest in Pre-Columbian America, spanning two million km^2, with its capital in Cuzco, Peru. The Incas were known as master architects and builders of massive stoneworks, fearsome warriors and practitioners of human sacrifice to mountain gods. They lacked a

Civilization	Time Period	Location	Brief Description
			written language, using spoken Quechua, quipus (a system of knotted threads used to record information) and ceramics to communicate. At their peak prior to the Spanish Conquest, their estimated population was 20 million or more.

Sources: Sullivan 1996, Longhena and Alva 1999.

The influx of Europeans after the Spanish Conquest (ca. 1533) transformed Andean landscapes and decimated human populations through disease and local conflicts. The cultures of indigenous groups were severely altered through subjugation by colonizers as well as adaptation to aspects of European culture (Roberts 2009). Andean nations gained independence during the 19th century, inheriting social conditions established during the Colonial period including trends in inequitable distribution of resources and population growth that increased even more rapidly during economic development of the late 20th and 21st centuries. These social and cultural changes and economic pressures resulted in diverse impacts on human well-being and natural landscapes.

5.3 Regional and National Demographics

There are no official census data that specifically describe the hotspot area. Geographic analysis carried out by the profiling team determined that there are 103 departments, provinces, states or regions in the seven countries that partially or wholly overlap the hotspot. To approximate the hotspot's current population, the most recent census data (population and population density) were obtained for 55 departments, provinces, states or regions with 40 percent or more of their area within the hotspot (Appendix 7). A summary of this population analysis is described below.

There are presently more than 57.5 million people living in the Tropical Andes Hotspot (Table 5.3) and many millions more outside of the hotspot dependent on the environmental services provided by Andean ecosystems. Urban dwellers comprise 72 percent of the region's population, with 28 percent living in rural areas (CAN 2014). Colombians comprise half (52.9 percent) of all the people living in the hotspot. This is an important consideration when aiming to maximize the social and economic impact of biodiversity conservation actions. From a national population perspective, nearly two thirds of all Colombians (30.4 million people) and more than half of all Bolivians (5.5 million) reside in the hotspot as do approximately one third of both Ecuadorians (6.1 million) and Peruvians (9.3 million). Fourteen percent of Venezuelans (4.3 million), 3 percent of Argentinians (1.7 million) and 0.3 percent of Chileans (200 thousand) live within the hotspot.

Table 5.3. National Population Statistics and Approximations for the Tropical Andes Hotspot

	Population (millions)		Average Population Density (people/km^2)	
Country	National	Hotspot (% of Hotspot, % of National Population)	National	Hotspot
Argentina	41.8	1.7 (Hotspot: 3.0, National: 4.1)	15	28
Bolivia	10.6	5.5 (Hotspot: 9.6, National: 51.8)	10	15
Chile	17.7	0.2 (Hotspot: 0.3, National: 1.1)	24	5

Country	Population (millions)		Average Population Density (people/km^2)	
	National	Hotspot (% of Hotspot, % of National Population)	National	Hotspot
Colombia	49.0	30.4 (Hotspot: 52.9, National: 62.0)	43	132
Ecuador	16.0	6.1 (Hotspot: 10.6, National: 38.1)	63	63
Peru	30.6	9.3 (Hotspot: 16.2, National: 30.4)	24	24
Venezuela	30.8	4.3 (Hotspot: 7.5, National: 14.0)	34	161
	Regional total: 196.5	**Hotspot total: 57.5 (29.3% of Region)**	**Regional average: 30**	**Hotspot average: 61**

Sources: CEPALSTAT 2014 for national populations and average population density data; INDEC-Argentina 2010, INE-Bolivia 2012, INE-Chile 2012, DANE-Colombia 2005, INEC-Ecuador 2010, INEI-Peru 2007 and INE-Venezuela 2011 for subnational census data used for hotspot population approximations.

Average population densities for hotspot countries were calculated by dividing the most recent national population figure by land area and do not differentiate between urban and rural areas nor Andean and non-Andean geographies. Average population densities for the hotspot area within each country were derived from available population density data for Department, Province, State and Regions that were included in the previously-described population analysis (Appendix 7).

The average population density of the hotspot is 61 people per square kilometer (Table 5.3), but varies greatly by country and geographic region. Across the hotspot, population density is by far the highest in the very densely populated capital districts of Caracas (530 people/km^2) and Bogotá (526 people/km^2) (Appendix 7). At the other extreme, the low population density (5 people/km^2) of the small Chilean portion of the hotspot reflects its rural and extremely arid aspect. The hotspot area of Bolivia is the second least densely populated (15 people/km^2), although it encompasses a large part of the country that is home to half of the country's residents.

In both Colombia and Ecuador, the national and hotspot human population densities are the same with 63 people/km^2 in Colombia and 24 people/km^2 in Ecuador. A pertinent comment made by a Colombian during the national consultation workshop was "What happens in Colombia is driven by the hotspot since most people live there and almost all economic activities occur there." In Ecuador, on the other hand, two thirds of the country's population lives *outside* the hotspot, and the country's largest city, Guayaquil, is on the coast and outside the hotspot. In this case, the significant population density of the Ecuadorian Andes can be attributed to the superb agricultural environment created by deep, well-drained, volcanic soils and abundant year-round water sources as well as relatively good roads and short distances to markets. As a result, farming communities, towns and cities abound across the Andean landscape. This contrasts sharply with the Andean regions of Peru and Bolivia which have drier and more seasonal climates, deep valleys and less fertile soils across broad expanses of Andean altiplano that are often far from the nearest road. These conditions have led to a lower population density in Peru and Bolivia, characterized by moderately populated river valleys and, at higher elevations, highly dispersed and isolated farming homesteads and long distances between towns and cities.

Indigenous and Afro-descendant Populations

The Tropical Andes Hotspot is home to myriad minority ethnic groups with unique cultures, languages and ritualistic understanding of the world. As a result, many hotspot inhabitants consider themselves indigenous and make up a significant part of the national population in some countries, as represented in Table 5.4. Bolivia is the country with the greatest percent indigenous population (62 percent of the national population) in the hotspot as well as in all of Latin America. Both Ecuador and Peru have estimated indigenous populations over 40 percent of their respective national populations, while 11 percent of Chile's population identifies as being indigenous and Argentina, Colombia and Venezuela have relatively small indigenous populations as compared to their national populations.

Table 5.4. Indigenous Population as a Percent of the National Population in Hotspot Countries

Country	Census Year	Indigenous Population as Percent of National Total
Argentina[1]	2007	3-5%
Bolivia[1]	2006	62%
Chile[2]	2012	11%
Colombia[3]	2005	3.4%
Ecuador[3]	2010	>40%
Peru[3]	2010	>40%
Venezuela[3]	2001	2.3%

Sources: [1] International Labor Organization, [2] Pulso, [3] Climate Alliance

A list of indigenous groups and Afro-descendants that live in areas that overlap with the hotspot in each country is given in Table 5.5. Across the tropical Andean region, the most numerous are descendants of the Inca, known as Quechua in Peru, Bolivia and Chile, and Kichwa in Ecuador. Within the hotspot, Aymara live in the Lake Titicaca region of southern Peru, Bolivia and northern Chile; Guaraní in Bolivia and Argentina; Awá at the border region of Ecuador and Colombia; and Afro-descendant groups in separate areas of Venezuela, Colombia, Ecuador and northern Argentina.

Table 5.5. Indigenous and Afro-descendant Groups in the Hotspot

Country	Number of Groups in the Hotspot	Indigenous/Ethnic Groups
Argentina	8	Atacama, Guaraní, Kolla, Ocloya, Omaguaca, Tilián, Toara, Afro-descendant
Bolivia	11	Aymara, Guaraní, Kallawayas, Mojeño, Moseten, Quechua, Tacana, Tsimane, Yuki, Yuracare, Afro-descendant
Chile	3	Atacameño, Aymara, Quechua
Colombia	14	Awá, Bari, Coconuco, Embera, Eperara, Guambiano, Ingá, Nasa, Paez, Pasto, Totoró, U´wa, Afro-descendant
Ecuador	6	Awá, A'i Cofán, Kichwa-Andes highlands (includes Pasto, Otavalo, Karanqui, Natabuela, Kayambi, Kitucara, Panzaleo, Chibuelos, Salasaca, Kisapincha, Waranka, Puruháes, Kañari, Saraguro and Palta), Kichwa-Amazon, Shuar, Afro-descendant
Peru	13	Ashaninka, Asheninka, Atiri, Awajún, Aymara, Candoshi-Shapra, Caquinte, Chachapoyas-Lamas, Jaqaru, Omagua, Poyenisati, Quechua (includes Yaru, Huanca, Chancas, Quero and Wari), Wampis
Venezuela	1	Afro-descendant

Sources: Consultants to the profiling process, Ministerio de Cultura del Perú, García Moritán and Cruz (2011) and Enríquez (2013).

In all hotspot countries, indigenous and Afro-descendant groups are represented by their local and regional organizations and national federations (see Chapter 7). In the Andes, any conservation, development or natural resource management initiative that involves indigenous lands or other indigenous interests will only have a chance of implementation and success if partnered from the start with entities that represent their indigenous constituencies.

The Andean Community member countries (Bolivia, Colombia, Ecuador and Peru) have recently made efforts to improve inclusion of Afro-descendants in the Andean region and attend to matters that are important to them. This includes implementing policies and activities that promote respect for the rights and participation of Afro-descendants, including the adoption of laws to recognize their ethnic origins (CAN 2014). Land tenure issues are among the most important to indigenous and Afro-descendant communities. Frequently, indigenous territories and communal or ancestral lands lack official recognition, and indigenous communities may spend many years attempting to obtain legal title to them. Some territories and communal lands are poorly demarcated or have ambiguous boundaries that overlap with private or public lands, as well as lingering, unresolved conflicts over rights for the use of traditional lands and natural resources, and the benefits from them.

Indigenous territories include important protected areas in the hotspot that may have weak management and be under strong pressure by external threats. Some examples of KBAs that are closely linked to indigenous groups are: (1) the Awá Territory in northwestern Ecuador; (2) the Reserva Natural La Planada in Nariño, Colombia that is adjacent to the Colombian Awá; (3) Cristal Mayu and (4) Yungas Superiores de Carrasco, both in the Carrasco Province (Cochabamba Department) of Bolivia that is predominantly Quechua; (5) Parques Nacionales Madidi and Pilón Lajas that are inhabited by Tacana, Lecos and Tsimane'-Moseten people, (6) Parque Nacional Sumaco-Napo Galeras in the Andes-Amazon transition zone of Ecuador that is adjacent to the Napo Kichwa; (7) Cordillera de Colán and (8) Río Utcubamba, both on outlying eastern Andean slopes in the Bagua Province (Amazonas Department) of Peru, an area that has an important population of Awajún.

Indigenous residents of the Bagua region of Peru made national and international news in 2009 for blocking roads and other social unrest that, after 59 days, led to police intervention and 34 deaths–a conflict known as *El Baguazo*–in protest of new laws that would allow oil and mining companies to enter their territories without consulting with and seeking consent from local communities (Interculturidad 2009). As a result, Peruvian laws were changed to recognize the right to free, prior and informed consent (FPIC) when collective indigenous rights are directly or indirectly affected, and that this consultative process would be financed by the government, among other stipulations (*El Comercio* February 15, 2014).

Culture, Language and Religion

The Andean spiritual vision (*cosmovisión*) considers that nature, humans and Mother Earth (*Pachamama*) are one together, that nature is a living being, and that like humans, all plants, animals, mountains, rivers, and other natural elements have a soul that is not and should not be dominated by humans (Mamani Muñoz 2001). The concept of nature as a living being with inherent rights has been recently adopted within the National Constitutions of both Ecuador (2008) and Bolivia (2009).

While Spanish is the official language throughout the region, the national governments of Ecuador, Peru and Bolivia have been making an effort to preserve minority languages by recognizing them as official or co-official languages and re-introducing bilingual education in rural areas. In rural areas where Spanish may be a second language for many indigenous people, most speak or at least understand it, except some members of older generations. In cities, there is widespread knowledge of English among educated middle and upper classes and younger people using the Internet and social media. Residents of rural areas in the Andes generally lack English skills unless they work in tourism enterprises, for example.

Over 90 percent of the hotspot's population consider themselves Catholic.

Migration and Urbanization

In all Andean countries there has been a marked trend of rural to urban migration, and to a lesser extent, rural to rural migration. Migration has occurred for a number of reasons including job opportunities and improved market access that translate to increased income, as well as access to better social services such as secondary education and modern health care. Also, poor land use practices and increased frequency and intensity of droughts has contributed to migration in the many areas of the Andean highlands. Census statistics compiled by the Economic Commission for Latin America and the Caribbean (CEPALSTAT 2014) for the period 2010-2015 indicate that populations of urban areas of hotspot countries are increasing at annual rates between 1.1 percent (Argentina and Chile) and 2.4 percent in Bolivia, due to a combination of population growth (rates of fertility greater than mortality) and immigration (Table 5.6). Note that these population growth data are country-wide and similar data are not available specifically for the hotspot. In contrast, populations of rural areas of Argentina, Chile and Colombia are currently declining and other hotspot countries show annual growth of 0.7 percent or less in rural areas. These data clearly indicate consistent national trends towards urbanization, most profoundly expressed in Argentina where the rural population has been declining 1.9 percent annually.

Table 5.6. Population Growth Rates for Tropical Hotspot Countries

Country	National Annual Population Growth (%) (2010-2015)	
	Urban	Rural
Argentina	1.1	-1.9
Bolivia	2.4	0.6
Chile	1.1	-0.4
Colombia	1.6	-0.4
Ecuador	1.9	0.2
Peru	1.3	0.7
Venezuela	1.6	0.1

Source: CEPALSTAT 2014

Indigenous people have been participants of the rural to urban migration trend across the hotspot, but most still live in the more remote and mountainous parts of the region. Some have migrated from one rural highland area to another or to a rural lowland area within their country. Others have migrated to neighboring countries or farther away, especially to Spain, Italy and the United

States for job opportunities in domestic, agriculture and construction sectors. Generally speaking, indigenous people continue to be more economically and politically marginalized than mestizo populations throughout the hotspot. There are exceptions however, such as some Otavalan populations of northern Ecuador and Quechua and Aymara populations in Peru and Bolivia, which have prospered economically in recent decades. Sometimes, a marked economic improvement is the result of money sent by foreign migrants to their families at home and income derived from remittances (*remesas*) has been an important percentage of the GDP in some hotspot countries.

Over the last twenty years, the tendency of foreign migration has not only improved family income in many Andean regions but it has also severely affected family structure in indigenous communities. For example, in the Ecuadorian Provinces of Imbabura, Cañar and Azuay, grandparents are raising children (because parents are working abroad) and quasi American-style houses (many unfinished) dot the countryside. Recently, however, the foreign migration trend, especially to Europe, and accompanying remittances has dropped off significantly due to the global financial crisis of 2009.

Human Development and Poverty

In all hotspot countries, the ratio of fertility and mortality rates exceeds the replacement rate of 2.0 (Table 5.7). In Argentina, fertility exceeds mortality by 2.2 and in Ecuador by 4.1; other hotspot countries have rates that fall in between. National literacy rates of the school-age generation in all hotspot countries are high, between 97.4 percent (Peru) and 99.4 percent (Bolivia), reflecting access to at least primary education for the vast majority of Andean inhabitants under the age of 24. Literacy rates of older adults are lower and even more so in the senior age group.

Table 5.7. Key Human Development and Poverty Indicators for Tropical Andes Hotspot Countries

		Country[1]						
Indicator	**Year**	**Argentina**	**Bolivia**	**Chile**	**Colombia**	**Ecuador**	**Peru**	**Venezuela**
Population								
Fertility rate (%)	2010-2015	16.7	24.6	13.9	19.4	21.5	19.8	19.8
Mortality rate (%)	2010-2015	7.7	7.1	5.8	5.6	5.2	5.5	5.3
Education								
Literacy rate (%) 15-24 years (%)	2011	99.2	99.4	98.9	98.2	98.7	97.4	98.5
Unemployment and Poverty								
Unemployment rate (%)	varies	7.1 (2013)	5.8 (2011)	5.9 (2013)	10.6 (2013)	4.6 (2013)	6.0 (2013)	7.8 (2013)
Poverty rate (%)	varies	ND[2]	36.3 (2011)	11.0 (2011)	32.9 (2012)	32.2 (2012)	23.7 (2012)	23.9 (2012)
Extreme poverty rate (%)	varies	ND	18.7 (2011)	3.1 (2011)	10.4 (2012)	12.9 (2012)	5.5 (2012)	9.7 (2012)
Gini coefficient	varies	ND	0.5 (2011)	0.5 (2011)	0.5 (2012)	0.5 (2012)	ND	0.4 (2012)

Source: CEPALSTAT 2014
[1]Data are for the whole country.
[2]ND=no data

Across the hotspot there are great disparities in wealth and human well-being. According to the Andean Community, efforts to reduce poverty in the region have been successful but overall poverty rates remain more than 30 percent for the general population and over 60 percent in the rural areas (CAN 2014). In all hotspot countries, poverty reduction has resulted in an increase in the middle class. World Bank (2013) analyses indicate that Argentina and Chile have increased their middle class population faster than Bolivia, Colombia, Ecuador and Peru. By 2011 the middle class comprised 38.8 percent in Argentina and Chile and 27.9 percent in the other Andean countries. Table 5.7 shows national poverty rates for each country in the hotspot, with the highest rate in Bolivia (36.3 percent) and the lowest in Chile (11.0 percent); other hotspot countries have poverty rates between 23 and 33 percent. The Word Bank defines extreme poverty as average daily consumption of $1.25 or less. In hotspot countries, the percent of the population living in conditions of extreme poverty ranges from 3.1 percent (Chile) to 18.7 percent (Bolivia).

Another definition of well-being is that of relative poverty compared to other members of society. The Gini coefficient is a measurement of inequality that varies between 0, which reflects complete equality and 1, which indicates complete inequality. Four Andean countries (Bolivia, Chile, Colombia and Ecuador) fall right in the middle of this indicator (0.5) while equality in Venezuela is slightly higher (0.4). In rural areas, especially those that are remote, levels of poverty and inequality tend to be more extreme. People living in such areas often have limited or no access to basic services (*e.g.*, piped water, electricity, household sanitation) and long distances to markets, secondary schools and health clinics. KBAs in the hotspot are often located in this type of remote environment that is difficult to reach due to rugged terrain and characterized by pockets of extreme poverty. Examples are the Bosque de Polylepis de Madidi (Bolivia), Corredor Ecológico Llanganates-Sangay (Ecuador) and Kosnipata Carabaya (Peru).

National Economic Indicators

All of the countries in the hotspot except Bolivia are ranked as “upper middle income” by the World Bank based on Gross National Income per capita. Bolivia is ranked as “lower middle income.” The most recent available data on per capita income and annual growth rate for all hotspot countries are shown in Table 5.8. In 2013, Bolivia had the highest income growth rate (6.4 percent), followed by Peru (5.2 percent), with Venezuela lagging (1.2 percent).

Table 5.8. Economic Indicators for Tropical Andes Hotspot Countries

Indicator	Year	National Accounts[1]						
		Argentina	Bolivia	Chile	Colombia	Ecuador	Peru	Venezuela
Annual GDP (millions, US$ using current exchange)	2012	477,028[2]	27,035	268,314	370,509	87,495	203,977	381,286[2]
Per capita income (US$)	2012	11,614	2,625	15,372	7,762	5,639	6,811	12,734
Income growth rate (%)	2013	4.5	6.4	4.2	4.0	3.8	5.2	1.2

Source: CEPALSTAT 2014
[1]Data are for the whole country.
[2]Currently, the official currency exchange rate fluctuates wildly, making this figure difficult to interpret.

Today, the Andean countries known as being friendly to international investors, namely Chile, Peru and Colombia, lead expectations for economic growth in the Andes region. Foreign investors are currently reluctant to invest in Venezuela, cautious about investing in Bolivia and are interested in Ecuador due to its small size and ambiguous investment policies (Schipani 2013). Argentina's uncertain economic climate has created a loss of credibility among local and foreign investors (Wharton 2013).

The following sections describe national demographic trends and socioeconomic conditions.

Argentina

The area of the hotspot in Argentina is 148,728 km^2. It overlaps six provinces in the northwestern part of the country: Jujuy, Salta, Tucumán, Catamarca, La Rioja and San Juan, though only the first three have more than 40 percent of their area in the hotspot. Over the last century, the general demographic tendency in this northwestern region has been migration away from high mountainous areas to the agricultural land at lower elevations outside the hotspot and a general increase in urban populations (INDEC 2010). Families remaining in rural Andean areas have become concentrated in small towns rather than living dispersed across the countryside.

Many farmers who live in the hotspot migrate seasonally to the lowlands (outside the hotspot) due to the high industrial demand for agricultural labor during harvest periods of citrus, soy bean and sugar cane. Ledesma, a sugar cane agroindustry in Jujuy that installed plantations on the flat lower border of the hotspot, began a program of landscape conservation in the Yungas as part of their company strategy after being criticized by environmental groups for compromising the ecological integrity of the region. To protect biodiversity and change the public perception about their business, this company has been supporting zoning for natural areas, biodiversity monitoring and information analysis and dissemination (Ledesma 2011). This type of private enterprise is a potential ally for CEPF or other future investors in regional biodiversity and ecosystem conservation.

In the hotspot area, especially Jujuy Province, uranium and silver mining (and zinc and tin, to a much lesser extent) create significant demand for labor, particularly during initial operating phases. Generally, the physically-demanding labor of mineral extraction is performed by the local population while technical and specialized positions are held by people from other areas. Two Canadian companies, Wealth Minerals Ltd. (uranium) and Silver Standard (silver) have projects in the exploration phase. Progress of the former project, an open-pit mine near the Quebrada de Humahuaca, a UNESCO World Heritage Site renowned for its use as a cultural route between the Andean highlands and the plains for over 11,000 years, has been stalled by local inhabitants and environmentalists protesting its potentially negative social and environmental impacts. The case is being tried in a Jujuy court (InfoTilcara, April 16, 2014). The other company, Silver Standard, is set to install what will be the largest silver mine in the world in northern Jujuy on the Bolivian border.

Eight ethnic groups live within the hotspot in Argentina, particularly in the Yungas, or montane forest, of Salta and Jujuy where hunter-collector ancestors have been traced back thousands of years (García Moritán and Cruz 2011). National censuses in Argentina didn't officially recognize or count indigenous peoples until 1966-68 when the first indigenous census attempted, ultimately unsuccessfully, to document the geographical location of the different groups and their demographic and socioeconomic characteristics. The indigenous social and legal situation improved in 1998 through legal recognition and adjudication of territorial land rights under two new laws designed to protect indigenous communities (García Moritán and Cruz 2011). In practice, however, land ownership is complicated by pre-existing rights of indigenous groups that are in conflict with land rights acquired at a later date by other citizens (Qullamarka 2008). Indigenous representatives at the national consultation workshop indicated that this is a problem for indigenous groups in the hotspot, particularly in the Yungas and Puna regions of Jujuy.

Bolivia

The area of the hotspot in Bolivia is 370,009 km^2. Eight of nine Bolivian departments are represented in the hotspot and three of them, La Paz, Oruro and Potosí, are located entirely within the hotspot. The population distribution in Bolivia is not homogeneous; rather, 71 percent of the country's population is concentrated in the "central axis" that runs between the cities of La Paz, Cochabamba and Santa Cruz, and population density is highest in the Departments of Cochabamba, La Paz, Tarija and Chuquisaca (INE 2012). Ten indigenous groups are located within the hotspot. The two largest groups are Quechua and Aymara that comprise 12.7 percent and 11 percent, respectively, of the national population. The Guaraní, occupying lower elevations of the hotspot towards the south, is another important group.

Centuries of exclusion and marginalization of rural and indigenous populations has resulted in high levels of poverty. According to the World Bank database, Bolivia was the poorest country in not only the hotspot but all of South America in 2012, with Gross National Income (GNI) of $2,220. For comparison, Honduras in the Mesoamerican Hotspot had a GNI of $2,120, and the second and third poorest countries on the South American continent were Paraguay (GNI=$3,400) and Guyana (GNI=$3,410). To improve this situation, the National Development Plan of Bolivia includes a measure to transfer surplus income from the hydrocarbon sector to reduce poverty

In Bolivia today there are two million internal migrants who tend to move from highland rural regions to the central axis cities and also to El Alto, located on the broad altiplano above La Paz (INE 2012). A UNDP (2009) study found evidence that people are attracted to certain areas by cultural patterns. For example, migrants from southern La Paz Department are attracted to El Alto, a commercial center that has dramatically increased in size and is predominantly indigenous. Internal migration may be a strategy for adaptation to climate change, because movements increase when climate fluctuations are severe. The most vulnerable populations and those most dependent on natural resources are those that move (IIED 2011). Since the 1980s, much of Bolivia has been under severe drought followed by periods of intense precipitation that appear to trigger human migrations, often over large distances (*e.g.*, 820 km from Potosí to Santa Cruz). Increased migration to Santa Cruz (away from the hotspot) has been linked to labor demand by natural gas companies and soy bean farms.

Mining has been an important component of Bolivia's economy for centuries – ever since silver was discovered in Potosí at the time of the Spanish colonization – and comprised 18.4 percent of Bolivia's GDP in 2012 (Table 5.9). Historically, Bolivians were used as forced labor to extract large quantities of silver that were sent to Spain. Thousands of mine workers died in mines or were poisoned by mercury used in the extraction process. After silver came a boom in the extraction of tin, which surged in price after the industrial revolution (Wicky undated).

Coca has been cultivated at mid-elevations in the Bolivian Andes since the Inca era, primarily in the Yungas north and east of La Paz, expanding in the 1980s into the Chapare region of Cochabamba as coca entered unauthorized markets associated with the cocaine trade. According to the 2012 national coca monitoring survey, cultivation has been on a downward trend since 2010 such that Bolivia is now the third largest producer of coca after Peru and Colombia. Decreasing levels of coca cultivation in Bolivia were brought about by a combination of government-led eradication efforts, as well as dialogue with farmers and social incentives. Between 2011 and 2012, government seizures of coca leaf rose 23 percent while prices decreased. In 2012, sales of coca leaf were estimated at $332 million, or 1.2 percent of the country's GDP and 13 percent of the agriculture sector's contribution to the GDP (UNODC 2013a).

Coca cultivation is officially forbidden by Bolivian law in protected areas, including national parks. Overall, the country's protected areas recorded a 9 percent decrease in coca cultivation to around 2,150 ha in 2012. The Isiboro Secure National Park, which accounts for half of coca cultivation in protected areas, registered a 4 percent reduction while Carrasco National Park (a KBA), responsible for over 40 percent of coca cultivation in protected areas, had a 15 percent decrease to 930 ha (UNODC 2013a).

Quinoa (*Chenopodium quinoa*) is a protein-rich grain that is produced by Andean farmers. The United Nations Food and Agriculture Organization (FAO) enthusiastically described it as "the only plant food that contains all the essential amino acids, trace elements and vitamins and contains no gluten" (Guardian Environment Network, January 25, 2013). Although quinoa is relatively new to U.S. and European markets, it has been a staple in the diet of indigenous peoples of the central Andes (Bolivia, Peru and Ecuador) since Inca times. In the 1980s, a combination of new migration patterns and community organization in the highlands, mechanization of agriculture and trade liberalization created export market opportunities for quinoa that resulted in a "quinoa boom" in Bolivia (Kerssen 2013). Ironically, the soaring demand for quinoa on international markets has raised farmers' incomes but tripled prices at home so that fewer Bolivians can afford to buy it (New York Times, March 19, 2011 and discussion during national consultation workshop).

Chile

Only a small part of Chile (73,842 km^2), the northeastern-most region, falls within the hotspot. In this predominantly rural environment, population density is low and most people consider themselves mestizo, although senior citizens are mostly indigenous Aymara. There is a tendency of internal migration away from Andean towns to the coastal cities of Antofagasta, Iquique and Arica, particularly of Aymara, Quechua and Atacameña peoples, leading to decreasing populations in rural regions of the altiplano. All immigration is linked to government policies on health and education, housing subsidies and employment in the mining sector. Immigrants to the hotspot area are mostly young men from other highland regions, indigenous people from other parts of Chile, and Bolivians, all associated with mining.

Mining is the predominant economic activity in the hotspot area where there are about 60 mines, 46 of which extract copper. Other mines extract gold, silver and other minerals. State-owned Codelco (*Corporación Nacional del Cobre de Chile*) is the world's largest copper producer, having produced 1.75 million tons in 2012. According to the company, it controls about 9 percent of the global copper reserves. In 2012, Chile as a whole accounted for more than 33 percent of global copper production, with total mine output of 5.37 million tons (Copper Investing News 2013).

Due to the economic importance of business, service and mining activities in Chile, the sector that includes agriculture, forestry and fishing contributes relatively little (3.6 percent) to the country's GDP even though all of those activities are practiced intensively in the country's central valleys, and fishing all along Chile's long coastline. Agriculture is difficult in the hotspot area due to the extreme aridity of the altiplano, but some crops are grown in high valleys. Competition for water threatens what little agriculture there is, as water is consumed in large quantities by upstream mining operations that continue to increase in scope (CONAF 2012).

Colombia

The area of the hotspot in Colombia is 350,290 km^2. The Andean region of Colombia is the most densely populated, and is the region of greatest economic activity and extent of land use change. Migration has been an important factor in the region, from rural areas to large cities such as Bogota, Cali and Medellin. Poverty has been declining in Colombia overall and in the Andean portion of the country in particular (DANE 2010), but income inequality has been increasing as a result of foreign investment in mining and oil sectors. Decades of violence in Colombia have been an important factor driving human migration, as well as income inequality (see Chapter 6). Among the departments with the highest indices of inequality is Cauca – the location of numerous KBAs in the Western Cordillera – with a Gini coefficient of 0.55, higher than the national average.

Indigenous territories (*resguardos*) are present in numerous areas of the hotspot, particularly in the northern Sierra Nevada de Santa Marta region and at various sites along the central and western Andean cordilleras. Indigenous groups tend to have the highest poverty levels in the country and are most vulnerable to external pressures. Many indigenous people live in areas under conflict in Colombia, and numerous mining and oil projects are under development or being implemented in indigenous and Afro-descendant territories.

Colombia has also been an important grower of coca and exporter of cocaine, which have direct and indirect implications for conservation in the hotspot. Though coca cultivation is not highly lucrative for farmers, the average $1,220 in annual income is frequently higher than other licit alternatives. While the majority of Colombia's estimated 48,000 hectares of coca lie at lower elevations outside the hotspot (UNODC 2013b), these crops do have direct environmental impacts on KBAs such as Munchique Sur and the Perija Cordillera, and contribute to violence and insecurity in the areas in and around KBAs. Cultivation of opium poppy occurs on a much smaller scale, with approximately 313 hectares nationwide, though poppies are grown entirely within the hotspot at elevations between 1,700 and 3,000 m and primarily in Nariño and Cauca Departments where this illegal activity represents a threat to KBAs such as La Planada. Crop eradication, especially through aerial spraying with glyphosate, has also had significant direct impacts on native ecosystems, and the National Tribunal in March 2014 prohibited this practice in national parks and protected areas (*El País*, March 31, 2014).

The agriculture sector contributed 6.5 percent of the GDP of Colombia in 2012 (Table 5.9). In the hotspot, the production and export of coffee and cut flowers were important to the national economy as was cattle production for domestic consumption. These three production activities provide special opportunities for collaboration and synergy on conservation initiatives over much of the Colombian Andes. Colombia is the world's third largest coffee exporter, and the Alta Cauca region that encompasses three KBAs (Serranía de las Minas, PNN Puracé and Puracé and its surroundings) produces 90 percent of the country's coffee (CDKN 2012). Because coffee is a tree crop grown on steep terrain, harvesting is labor-intensive and 96 percent of 563,000 coffee growers have farms of fewer than five hectares (Federación Nacional de Cafeteros de Colombia). Cut flower production is centered in mountain valleys around the cities of Bogota and Medellin, and livestock production, especially dairy cattle that thrive in cooler mountainous regions, stretches across the Andes.

Colombia has significant coal reserves and is the world's fourth largest producer. A large corporate player in this sector is Drummond, a U.S. Company that has been in Colombia since the 1990s and operates two mines in Cesar Department between the northern end of the Eastern Andean Cordillera and the Sierra Nevada de Santa Marta. Drummond has been the center of numerous environmental controversies, having been fined and ordered to relocate towns due to air pollution and dumping, though the company is also viewed as an economic lifeline by local residents who have few other economic opportunities in this poor region (Wall Street Journal, February 7, 2014). In this northern region, the geographically isolated Sierra Nevada de Santa Marta is a culturally and biologically diverse massif that includes a National Park. As social conflicts decrease, the region has been developing and improving its cultural, archaeological and ecotourism options and local environmental CSOs would be avid partners on conservation initiatives (Pro-Sierra Nevada de Santa Marta Foundation representative at national consultation workshop).

Ecuador

Nearly half of Ecuador's land area (117,867 km^2) lies within the hotspot. Census data for the period 2001-2010 indicate that the annual population growth rate of the highland region was 1.95 percent while the average number of children per family had dropped to 1.6, compared to 2.3 in 1990 (Villacís and Carillo 2012). Human migration, principally from rural areas to urban centers, is an important feature of the Ecuadorian highlands. Migration is both internal and from the neighboring countries of Colombia and Peru. Four trends stand out in the hotspot region: (1) internal migration to Quito due to its concentration of economic activity, (2) migration towards the southern part of the country for new job opportunities in mining, (3) population growth in the Napo Province (upper Amazon) linked to hydroelectric dam construction and (4) immigration of Colombian refugees seeking to escape violence and difficult social conditions to northern Ecuadorian provinces. The southern provinces (Azuay, Cañar and Loja) continued to experience out-migration but to a lesser degree in 2010 than in 2001 (Villacís and Carillo 2012).

According to the 2010 national census (INEC 2010), the indigenous population in Ecuador numbered 1,018,176 . Indigenous people inhabiting the hotspot identify themselves as highland Kichwa, lowland Kichwa, Awá, Cofán and Shuar nationalities, and Afro-descendants also inhabit the hotspot. In Ecuador, the largest areas of intact forest and páramo ecosystems that remain in the country outside of legally protected areas are in indigenous territories. Examples in the hotspot include Las Golondrinas that is protected by Pastos (a subgroup of highland Kichwa) in Carchi Province and Awá territory that is associated with a KBA in northwestern Ecuador. In the hotspot, these natural areas are under threat from numerous highway infrastructure projects, agriculture, cattle grazing and extractive activities (*e.g.*, mining, oil and logging).

Nationwide, poverty continues to drop and health and education indicators show improvements, though areas with high concentrations of indigenous and Afro-descendant populations and rural areas continue to lag behind national averages (INEC 2010). Income inequality is greatest in Amazonian regions and Esmeraldas Province, which is partially a consequence of the country's "dollarization" process (1999-2000) that reduced poverty but increased societal inequality (Wong 2013). To help alleviate these issues, the National Plan for Well-being (*buen vivir*) 2013-2017 places emphasis on social investment to relieve poverty and improve the condition of marginalized populations (SENPLADES 2013).

The Ecuador agricultural sector (that includes forestry and fishing) contributed 9.4 percent to the GDP (Table 5.9), largely through income derived from the export of banana and shrimp, both on the coast outside the hotspot. From the Andes, the principal export product is cut flowers, and to a much lesser extent coffee and some vegetables such as broccoli florets and artichoke hearts. The Sumaco Napo-Galeras KBA is affected by deforestation for production of naranjilla (*Solanum quitoense*, a fruit in the tomato family) as well as cocoa (*Theobroma cacao*), a native tree crop. Ecuador is an important cocoa producer (eighth in the world), some of which is grown within the hotspot but most at lower elevations on both sides of the Andes. The country also has timber plantations in the hotspot, particularly introduced species of pines, cedars and eucalyptus.

The mining sector contributed 12.5 percent to the Ecuadorian GDP in 2012 (Table 5.9) with important environmental and social impacts. Oil production and export was the major contributor but production activities are concentrated in the Amazon below 500 m elevation and outside the hotspot. Gold mining in Ecuador, on the other hand, does occur in the hotspot, particularly in Imbabura Province in central Ecuador that affects the Intag-Toisán KBA and in southeastern Ecuador within and adjacent to the Condor-Kutuku-Palanda Corridor.

Peru

The Tropical Andes Hotspot encompasses a large part of the country (453,270 km^2) including at least a small part of all 24 departments, even those that are predominantly Amazonian or coastal. About one third of all Peruvians live in the hotspot but population density is extremely variable, with the highest population density in Cajamarca (northern Peru) and the most sparsely populated areas in southeastern Peru. The indigenous population was over four million people in 2010 and includes 77 ethnicities throughout the country, many of which inhabit areas within the hotspot. The Quechua linguistic group comprised of many ethnicities is by far the largest, making up more than 12 percent of the national population.

Three decades after agrarian reform was implemented in Peru, rural areas in the hotspot are dominated by small farmers - many still waiting to formalize land ownership - on whom the nation depends for food, but whose productivity remains low for lack of government support (Eguran 2005). Recently, as a result of the increasing international profile of Peruvian cuisine and its native ingredients, there is a growing entrepreneurial agriculture sector producing specialty products (*e.g.,* quinoa and kiwicha cereals, chips of different Andean tubers, sacha-inchi oil high in antioxidants) oriented towards international markets.

Migration and urbanization in Peru is high – three quarters of the national population was classified as urban (INEI 2007) – due to education and job opportunities in towns and cities and the centralization of commercial activities. Additionally, Andean farmers and herders in rural areas may be experiencing habitat degradation due to mining and infrastructure development (*e.g.,* scarce or polluted water, degraded soil resources) as well as feeling the impact of the changing climate (*e.g.,* more intense and prolonged cold spells on the altiplano, extended dry seasons in mountain valleys) and therefore migrating to urban areas. According to USAID, Peruvian land ownership laws are also partially responsible for migration tendencies due to "compulsory acquisition of private property by the government" for mining activities.

During the period 2002-2007, the migration rate from one highland region to another was 27 percent and 19 percent from the highlands to coastal cities (INEI 2007). Highland migration to lowland Amazonian areas also occurred, most notably from Puno to Madre de Dios, the region that has the highest immigration rate in the country in response to multiple "boom" economic opportunities since the 1990s: gold mining, mahogany logging and the construction of the Interoceanic highway. The Amazonian lowland regions of Madre de Dios that are centers of intensive industrial and artisanal gold mining and associated social and environmental conflicts are largely outside of the hotspot.

The Interoceanic highway is the new transportation axis that connects the Atlantic (Brazil) to the Pacific (Peru) and traverses the hotspot as it crosses the Peruvian Andes. Much of the highway's construction cost in Peru was paid by the Brazilian government as it expects to reap enormous economic benefits through access to Pacific ports for trade with Asia, hydroelectric power generated from Andean rivers, and food such as potatoes from high elevations. There is no doubt that the highway will create a tremendous impact on high conservation value forests in Peru as it crosses the most biodiverse region of the Andean-Amazonian transition zone where it is likely to affect KBAs on the eastern slopes of the Cuzco and Puno regions, such as Manu, Santuario Histórico Machu Picchu, Lagos Yanacocha, Kosñipata Valley and the Cordillera Carabaya.

According to the UN Office on Drugs and Crime, in 2012, Peru again became the largest coca growing country and exporter. Although Peru had a 3.4 percent reduction in the area cultivated from the previous year, Colombia had a 25 percent reduction, leaving Peru as top producer (UNODC 2013c). The principal impact of coca production on conservation is the intrinsic insecurity and violence related to drug trafficking that makes implementing conservation and sustainable production activities in rural communities near coca producing areas difficult if not impossible. This is the case in much of the Nariño Department of Colombia as well as some eastern Andean valleys and regions of Peru (*e.g.,* Ene, Apurimac) and Bolivia (*e.g.,* Chapare).

Venezuela

The area of the hotspot in Venezuela is 69,523 km^2. Portions of four largely Andean states overlap the hotspot: Merida, Miranda, Táchira and Trujillo, as well as the Capital District of Caracas. The population of the region is predominantly white, with some Afro-descendants.

There are no indigenous populations in the hotspot region of Venezuela. Similar to the rest of the country, the average age of the population is 28 years and the senior age group (>65 years) is increasing (INE 2011). Government-financed community councils, organized by towns or parishes, develop projects of local interest, such as water provision. Community cooperatives are common throughout the region and important in the development of local economies. State-run national parks have often been ineffective for conservation. In some cases, the private sector created reserves and ecotourism lodges to protect habitat and wildlife but later were expropriated by the government (BBC, June 13, 2011).

Venezuela has been undergoing social and economic turmoil, especially since the death of President Hugo Chávez in 2013. Venezuela has the world's largest oil reserves (USEIA 2014) but production has fallen over the last decade, is heavily subsidized for domestic consumption, and is sold to Cuba for sub-market prices or in barter deals. Funds of the state-owned oil company, PDVSA, have been used for social programs that have helped maintain government support, especially by the poor (Financial Times, February 21, 2014). Even so, street protests in February 2014 resulted in dozens of deaths.

Venezuela's inflation reached 56 percent in 2013 (Financial Times, February 21, 2014). Furthermore, crime has risen and basic goods, such as bread, cooking oil and milk are scarce (NPR, March 16, 2014). According to the Economic Commission for Latin America and the Caribbean (ECLAC 2014) the economic projection for Venezuela in 2014 is a contraction of -0.5 percent due to the impact of that nation's complex economic situation. For comparison, the Latin America regional growth rate was projected to be 2.7 percent.

5.4 Economic Trends

Until 40 to 50 years ago, all countries in the hotspot had predominantly natural resource based economies dominated by agriculture, livestock and fisheries (marine, *e.g.*, anchovy in Peru). Whereas these sectors continue to be economically important today, all hotspot countries experienced great economic growth in the 1990s with a shift to an export-driven industrialized economy based on extraction of non-renewable resources, namely oil, coal, natural gas, copper, gold, silver and other metals and non-metals. These extractive economic activities are critical to the economic development of hotspot countries but they are also renowned to cause environmental damage and to be challenging to regulate and control.

National economic profiles were compared across hotspot countries based on the contribution to the GDP of economic activities in the following nine broad categories: (1) financial intermediation and real estate, renting and business activities, (2) social and personal services that include public administration, defense, compulsory social security, education, health and social work, and other community social and personal service activities, (3) manufacturing, (4) wholesale and retail trade that includes repair of goods, and hotels and restaurants, (5) mining and quarrying, (6) construction, (7) agriculture, hunting, forestry and fishing, (8) transport, storage and communications, and (9) electricity, gas and water supply (Table 5.9).

Table 5.9. National Economic Profiles of the Hotspot Countries

	Contribution (%) to GDP in 2012 (rank order within country)						
Economic Sector	Argentina	Bolivia	Chile	Colombia	Ecuador	Peru	Venez[1]
Financial intermediation	16.0 (3)	10.8 (6)	25.1 (1)	20.4 (1)	15.9 (1)	14.2 (3)	7.8 (6)
Social and personal services	21.2 (1)	18.9 (1)	17.0 (2)	16.7 (2)	15.8 (2)	15.2 (2)	14.4 (3)
Manufacturing	19.5 (2)	12.8 (3)	11.2 (5)	13.0 (3)	12.9 (3)	14.0 (4)	13.6 (4)
Wholesale and retail trade	15.7 (4)	11.1 (5)	11.7 (4)	12.4 (4)	12.6 (4)	19.4 (1)	15.5 (2)
Mining and quarrying	3.8 (8)	18.4 (2)	14.2 (3)	12.3 (5)	12.5 (5)	10.5 (5)	28.4 (1)
Construction	5.9 (7)	3.3 (8)	8.3 (6)	8.6 (6)	11.8 (6)	8.2 (7)	8.5 (5)
Agriculture, hunting, forestry and fishing	9.0 (5)	12.3 (4)	3.6 (8)	6.5 (7)	9.4 (7)	7.0 (8)	5.7 (7T)
Transport, storage and communications	7.9 (6)	10.0 (7)	6.6 (7)	6.4 (8)	7.8 (8)	9.7 (6)	5.7 (7T)
Electricity, gas and water supply	1.0 (9)	2.4 (9)	2.4 (9)	3.7 (9)	1.3 (9)	1.9 (9)	0.4 (9)

Source: CEPALSTAT.
[1]Venezuela sectoral GDP data are from 2010.

Key economic sectors that have an impact on natural ecosystems in the hotspot are agriculture, livestock, hydrocarbon extraction and mining, forestry and tourism. With respect to economic importance as expressed in Table 5.9, both livestock and forestry are contained within the agriculture sector, tourism is largely included in the trade sector (*i.e.* hotels and restaurants) as well as the transport sector, and the mining sector includes quarrying to build roads, dams and other public works infrastructure.

Agriculture

Agriculture is a major economic component in all hotspot countries, both in terms of employment and contribution to gross domestic product. Agriculture (including livestock and forestry) makes its greatest contribution to GDP (12.3 percent) in Bolivia followed by Ecuador (9.4 percent) and Argentina (9.0 percent) (Table 5.9).

A typical tropical Andean hillside supports a multitude of crops along an altitudinal gradient. For example, in Colombia, commercial crops of sugar cane are grown between 500 and 1800 m elevation, coffee between 800 and 1800 m, and potatoes above 2500 m. Potatoes are native to the Andes, with over 4000 edible varieties, and the International Potato Center that carries out agricultural research and maintains a gene bank for potato, sweet potato and Andean roots and tubers is based in Lima. The production of potatoes at commercial scale requires significant chemical inputs of both pesticides and fertilizer, causing negative impacts on human health and the environment. Greenhouse-grown cut flowers for export are grown in high valleys and traditional agriculture is carried out along the entire altitudinal gradient. Most fertile farming areas on Andean slopes and valleys were deforested decades, if not centuries ago, which placed severe pressure on remnant montane forests and páramo, especially for potato crops and pasture lands. In the Andean-Amazon transition zone, land-use change is more recent. The National Planning and Development Secretariat in Ecuador (SENPLADES 2013) indicated that in the mountainous or hilly areas of the upper Amazon, most land use change now occurs on mid-sized farms between 20-50 hectares in size rather than smallholders who used to be the prime extenders of the agricultural frontier.

As quinoa has gone from a local agricultural staple to a global commodity in a short time, the UN proclaimed 2013 the year of *quinoa*, amid questions about the real social and environmental benefits and liabilities of its burgeoning production, especially in Bolivia (Guardian Environment Network, January 25, 2013). Quinoa has become a flagship product in the Bolivia's development plan. Its economic and social importance was officially recognized by Andean Community governments (CAN 2013) through a declaration signed by the four Ministers of Agriculture to promote the production of quinoa within the framework of community and family agriculture and towards regional and national food security and sustainable development. Quinoa producer groups could be important allies in conservation and development initiatives that promote good land and water management practices in the altiplano region.

Coffee production is important in Andean regions from Venezuela to Bolivia. Coffee has long been an important domestic and export product in Colombia dominated by small-scale coffee growers cultivating shade coffee in diverse agroforestry systems or full-sun monocultures. More recently, highland coffee grown by smallholders on eastern and western Andean slopes of Ecuador, Peru and Bolivia has taken off in export markets, particularly for niche organic, "bird-friendly," "fair-trade" and shade coffee markets. Coffee production is a significant activity in areas near KBAs and corridors such as Tatama-Paraguas (Colombia), Podocarpus National Park (Ecuador) and Alto Mayo (Peru). Coffee producer organizations that represent communities and families would be excellent partners for developing conservation strategy in the hotspot. Coffee growers are strongly organized in Colombia under the National Coffee-growers Federation (*Federación Nacional de Cafeteros*); CEPF supported this Federation ten years ago to mainstream conservation best practices into coffee production in the Paraguas-Tatama corridor (CEPF 2006). In 2004 approximately one fifth of coffee growers in Peru were estimated to belong to producers' cooperatives (Walsh 2004). In these four Andean-Amazonian countries, cocoa agroforestry and its transformation to single-origin chocolate has undergone a similar expansion aimed for specialized export markets, but most cocoa is grown at lower elevations than occur in the hotspot.

It is interesting to note that coffee and cocoa were promoted in the region as crop alternatives to replace the production of illicit crops, particularly coca. For this reason, large amounts of technical assistance and financial support has been provided by national and foreign governments (particularly the U.S.) to catalyze successful coffee production and to create links with specialized export markets willing to pay a premium price for a product with certifiably positive social and environmental impacts. Though coffee has largely succeeded and generated important income, it is unclear to what extent it has replaced coca. Needless to say, huge financial proceeds garnered from the cultivation and transformation of illicit crops (coca and poppies) also makes an important contribution to regional and national economies of Peru, Bolivia and Colombia.

Livestock Production

Livestock production in the hotspot consists primarily of beef and dairy but also includes small livestock (*e.g.*, sheep, pigs, chickens, guinea pigs), and husbandry of domestic llamas and alpacas in Ecuador, Peru, Bolivia and Chile. In the puna, alpacas are raised for their fine wool for export markets as well as meat for local consumption.

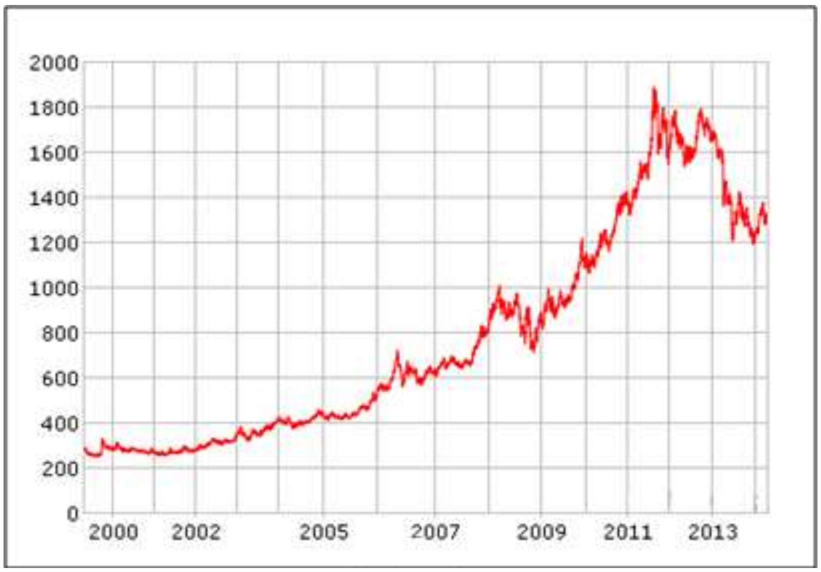
Beef and dairy cattle make an important contribution to the economies of most hotspot countries but often in areas outside of the geographical limits of the hotspot; this is particularly the case of Argentina. In Colombia, however, the Andean slopes and valleys are the center of the country's cattle production, with 39 million hectares of pastures and second-growth and 500,000 cattle ranchers dedicated to the activity (FEDEGAN 2012). The Colombian cattle sector, already the fourth largest in Latin America, is growing rapidly with an eye to global markets (ProExport 2013) opened by free trade agreements and the eventual elimination of hoof-and-mouth disease. This could create increased pressures on hotspot forests, but could also harness market opportunities for conservation. The government's Strategic Livestock Plan includes a large conservation element, namely a project to make Colombia's cattle production sustainable (*Proyecto Ganadería Sostenible*) by eventually reverting 10 million hectares of pasture to nine other less-intensive land uses including some kinds of agriculture and conservation (FEDEGAN 2012). This large and ambitious project, being implemented by the Colombian Federation of Cattle Ranchers (FEDEGAN), received funding from the GEF, the National Cattle Fund and other sources (2007-2010) for a pilot silvopastoral project in Rio La Vieja (J.C. Gómez, pers. comm.). FEDEGAN is now active in five areas of the country, some which overlap with or are adjacent to KBAs. For example, a coffee region (*eje cafetero*) in the Western Cordillera north of Cali overlaps the Farallones de Cali, Serranía de Paraguas and Tatama-Paraguas KBAs. Given FEDEGAN's size, political clout and ongoing initiative for environmental restoration, it could be an important ally or partner for conservation, synergistic collaboration and generating new funding options.

Hydrocarbons and Mining

Non-renewable extractive activities, particularly of hydrocarbons (*i.e.* coal, crude oil and natural gas) and mining are important economic sectors in all of the hotspot countries. Chile, the number one copper producer in the world, closed 2013 with a 6.1 percent increase in production compared to the previous year, according to the national statistics bureau (BNamericas 2013). Copper mining is the primary income-producing activity in Chile's limited area within the hotspot that includes small KBAs in the high semi-desert area, and the industry's demand for water conflicts with other users in the high desert region. Venezuela and Ecuador are both members of the Organization of the Petroleum Exporting Countries (OPEC). Oil concessions are located in parts of these countries outside of the Tropical Andes Hotspot. Venezuela remains highly dependent on oil revenues, which account for roughly 95 percent of export earnings and 12 percent of the GDP. Ecuador is substantially dependent on its petroleum resources, which have accounted for more than half of the country's export earnings. The Bolivian national economy is driven by high prices for its principal products, natural gas and minerals. Bolivia has the second largest natural gas field in the world (located outside the hotspot) but there are gas reserves in the Yungas montane forest belt whose future extraction could threaten KBAs in the Yungas Inferiores de Carrasco, Isiboro-Sécure/Altamachi, Madidi and Pilón Lajas. In 2006, the Bolivian government nationalized the hydrocarbon sector and the nation's economy depends almost exclusively on natural gas sales to Brazil and Argentina.

Metal mining is an important economic sector seen as having enormous growth potential by hotspot country governments. Chile and Peru are the world's first and second largest producers of copper, respectively, while Peru is the third largest producer of silver and sixth largest producer of gold (KPMG 2013). Gold-mining in Peru has negative environmental impacts or threatens KBAs in the north such as Parque Nacional Huascarán around the city of Huáraz (Ancash Dept.) and Río Cajamarca and San Marcos in Cajamarca Dept., and Quincemil (Cuzco Dept.), Carabaya, Sandía and Valcón (Puno Dept.) in the south. Furthermore, all hotspot countries have significant reserves of gold. The explosive growth of gold mining in Andean nations, driven by sharply rising market prices since the financial crisis of 2009 (Figure 5.1), has grown to out-of-control proportions with the sector characterized both by large numbers of illegal or informal small-scale miners and some large commercial operations with international investors.

Figure 5.1 International Gold Price (US$/ounce) 1999-2014



Source: goldprice.org

Most governments are struggling to take hold of resulting chaotic social, environmental and economic situations associated with informal or illegal mining. Peruvian authorities estimated that 20 percent of the gold sold on international markets was mined illegally (*El Comercio,* Dec 23, 2013). The innumerable negative consequences of gold mining at all scales are severe and well documented, causing important social (mining concessions displacing agriculture, Oxfam America 2014), human health (mercury contamination, Ashe 2012, WHO 2013) and environmental (contamination of aquifers, *El Comercio*, March 8, 2012; deforestation, ACA 2013) impacts that affect ecosystem integrity and millions of people in hundreds of sites in multiple hotspot countries. Mining laws and regulations exist in each country, but implementing them effectively to stem the growth of illegal activities will be a formidable challenge as long as the price of gold remains high on international markets.

Seeking to emphasize formal, commercial (and royalty-paying) operations, national governments have welcomed economic growth of the mining sector and courted foreign investment. Colombia, Ecuador and Peru have identified mining as a key sector to expand with foreign investment in coming years, by US and Canadian companies and the Chinese government, as examples. Some Colombians refer to the government's development strategy for mining as a locomotive (*locomotora minera*) that is impossible to stop. In Ecuador, the government has prioritized five large-scale mining projects for gold and copper, as key drivers for economic growth. These new projects are all within the hotspot and may threaten southeastern KBAs Bosque Protector Alto Nangaritza, Parque Nacional Podocarpus and the Cordillera del Condor, in particular, In Chile, public (Codelco) and private businesses – INV Metals (Canada) and Corriente Resources (China) – are poised to initiate mining operations in the southern part of the country, outside of the hotspot. Small and medium-scale gold mining operations are also multiplying in that region.

Large-scale mining operations, particularly for gold, have proven highly controversial in the hotspot area due to concerns about their impact on fragile ecosystems such as páramos and other wetlands and water resources (AIDA 2012, Pulitzer Center 2011). In Colombia, the Angostura gold mine in the Eastern Cordillera, owned by Canadian-based Eco Oro Minerals, and the La Colosa gold mine in the Central Cordillera, owned by South African AngloAshanti Gold, have both faced fierce opposition and delays (Jamasmie 2014). While in Peru, Newmont Mining's $4.8 billion Conga mine in Cajamarca became emblematic of the conflicts between large-scale mining operations and local communities.

In Peru, the Antamina copper and zinc mine (BHP Billiton, Xstrata, Tek and Mitsubishi Metals Group) has had some engagement with conservation issues including a *Polylepis* conservation and restoration project with Conservation International in 2005-2008. This project involved local communities in the Conchucos valley that forms a corridor between the Huascaran National Park and the Huayhuash Reserve in the Ancash Department (BBOP 2009).

Forestry

In most hotspot countries, exploitation of natural forests is an economically important sector that has huge social and environmental impacts, but most of the remaining natural forests with commercially valuable timber species occur in the more productive Amazon (Venezuela, Colombia, Ecuador, Peru and Bolivia) and Chocó (Colombia and Ecuador) regions and to a lesser extent, the temperate rain forests (Chile). For this reason, most large commercial logging operations work outside of the Tropical Andes Hotspot.

In the hotspot, smaller-scale, often informal or illegal logging for domestic markets predominates. High levels of "informality" (*i.e.* no regard for 'best practices' of forest management such as implementation of annual harvest plans that include minimum cutting diameter and retention of a percentage of individuals of each harvested species) and unsustainable forestry practices persist and usually result in forest degradation that affects virtually every forested KBA between 500-2000 m elevation in the hotspot. In Ecuador, for example, owners of relatively small areas of forest are the usual actors behind informal forestry, either selling their standing trees to logging operations, or selling their logs and planks at local markets. In Ecuador, there has traditionally been little or no financial incentive from public or private sources to manage natural forests, resulting in negative impacts on environmental quality, ecosystem services and biodiversity conservation. The recent advent of Socio Bosque programs, however, has begun to provide some incentives for forest management.

Forest certification is an important tool to eliminate informality and promote best practices in forest management. The Forest Stewardship Council (FSC) provides a connection between the forest and the consumer by ensuring highest social and environmental benefits. Around the world there is a growing niche market for certified wood products. Though FSC certification is not a financial incentive, and the process is costly especially for small operations, there is a tendency towards certification in the hotspot. All countries in the hotspot presently have at least one FSC-certified forestry operation.

Plantation forestry covers about 2.2 million hectares in central Chile, but all outside the hotspot. In Argentina, at least two forestry initiatives are underway in the northern part of the country and within the hotspot area, both aimed at reforestation in the Yungas and establishing environmentally-sustainable forest plantations for production (AFORSA undated, Balducci *et al.* 2009). Other countries have forest plantations within the hotspot over smaller areas. Ecuador and Peru, for example, both have wood industries based on pine plantations (*Pinus radiata*, *P. patula* and other introduced conifer species) in the Andes. Field studies in the Ecuadorian Andes have documented the environmental impact of pine plantations on páramo soil quality and hydrology with results that demonstrated nitrogen depletion and acidification of surface soils (Farley and Kelley 2004) and a 50 percent reduction of water yield (Buytaert *et al.* 2007), both indicating a negative effect on this high Andean habitat that is critical for water provision.

In addition to industrial plantations, social forestry endeavors such as agroforestry that aim to meet the basic needs of communities and improve their well-being is widely practiced in the hotspot. In Colombia, for example, forests of the native timber bamboo, *Guadua angustifolia*, grow between 900-2000 m elevation in the hotspot adjacent to KBAs in the coffee-producing region such as Serranía de los Paraguas. Stands of guadua bamboo have provided rural communities with income from the sale of culms (stems) on national and international markets (Arango and Camargo 2010). Guadua grower associations in both Colombia (*e.g.,* Asoguadua, Asobambú and Fundaguadua) and Ecuador are producer groups that could be important partners in conservation activities in the hotspot.

Tourism

In most hotspot countries, the growth of the tourism sector, as measured by the number of international tourist arrivals, is much greater than the average global 2012/2011 growth rate of 4 percent (UNWTO 2013). Some hotspot countries had double-digit growth of international arrivals: Venezuela with 19.3 percent, Bolivia with 17.8 percent, Chile with 13.3 percent, Ecuador with 11.5 percent and Peru with 9.5 percent (Table 5.10). Increased security has played an important role in attracting foreign tourism, particularly in Peru and Colombia. Note that Venezuela’s high rate of international arrivals (Table 5.10) includes entries of non-resident Venezuelans (UNWTO 2013).

Table 5.10. Importance of the Tourism Sector in the Hotpot Countries

Country	Percent (%) of GDP in 2012	No. of International Tourist Arrivals[8] 2012 (million)	Change (%) 2012/2011	KBAs of Particular Importance for Tourism
Argentina	6.5[1]	5.59	-2.1	
Bolivia	3.7 (2011)[2]	1.11	17.8	Cotapata, Zongo Valley, PN Madidi
Chile	3.2[3]	3.55	13.3	
Colombia	2.8[4]	2.18	6.4	RN La Planada, PNN Farallones de Cali, PNN Cueva de los Guácharos, PNR Páramo del Duende, PNN Munchique, Selva de Florencia
Ecuador	6 to 7[5]	1.27	11.5	RE Cotacachi Cayapas, PN Sumaco-Napo Galeras, Cord. de Huacamayos-San Isidro-Sierra Azul, Mindo, Maquipucuna, Los Bancos-Caoni, Agua Rica, Intag-Toisán, PN Podocarpus, PN Cotopaxi
Peru	8.0[6]	2.85	9.5	Colán, Abra Patricia-Alto Mayo, Machu Picchu, PN Manu, Kosnipata Carabaya, Ocobamba-Vilcanota
Venezuela	3.0[7]	0.71	19.3	PN Henri Pittier, PN Macarao, MN Pico Codazzi

Sources: [1]América Economía 2013; [2]La Razón 2011; [3]Turismo Chile 2013; [4]Mesa C. 2013; [5]Expreso 2012; [6]Gestión 2013; [7]MINCI 2014; [8]World Tourism Organization-UNWTO 2013.

While tourism grew in most of the world, the number of international visitors to Argentina dropped off in 2012 and 2013, reflecting the country's economic and social difficulties (*La Nación*, February 6, 2014). Nonetheless, Argentina was still the most visited country in the hotspot, having received almost 5.6 million international visitors during 2012 (UNWTO 2013) (Table 5.10). Argentina's tourism sector, including both domestic and international tourists as well as the outstanding performance of "meetings tourism" (*e.g.*, conferences, conventions, exhibitions and sporting events), especially in Buenos Aires, Mendoza and other principal cities, generated 6.5 percent of the country's GDP in 2012, according to the Argentine government (*América Economía*, September 15, 2013).

Most of Argentina's adventure and nature tourism focuses on destinations in Patagonia outside of the hotspot in the temperate southern part of the country. Indigenous representatives and others who participated in the Argentina workshop discussed ongoing efforts to develop community tourism in culturally and biologically diverse areas of Jujuy and Salta Provinces within the hotspot (see also Chapter 7).

In Bolivia, ecotourism is nascent, comprised primarily of backpackers who tend to travel on limited budgets. Nature and adventure tourism in the hotspot is related to hiking, mountain biking, mountaineering and other extreme activities. The Uyuni salt flat – the world's largest – is a growing tourist destination high in the Andes of Potosí and Oruro Departments and part of the biologically important Chilean/Bolivian Altiplano Saline Lakes Corridor. The road and airport project in Rurrenabaque, financed by the World Bank, is designed to promote tourism and other development in Madidi National Park.

The San Pedro de Atacama community in the Chilean portion of the hotspot recently received a significant public-private investment to develop ecotourism (SERNATUR undated).

Ecotourism in Colombia is on the rise, for example in the culturally and biologically diverse Sierra Nevada de Santa Marta region that is rebounding from years of social conflict. In

Colombia's coffee-growing region, the Serraniagua Corporation, a community environmental organization, offers "coffee tourism" and ecotourism to the Serranía de los Paraguas, a KBA in the Western Cordillera.

The ecotourism industry directed towards destinations in the Ecuadorian Andes and upper Amazon is growing as the Ministry of Tourism and travel agencies promote a diverse repertoire of ecologically important destinations – associated with KBAs in Mindo, Los Bancos, Podocarpus National Park, as examples - and simultaneously distinguish continental highlights from the international lure of the Galapagos Islands. Ecuador has much scaling-up potential for ecotourism.

Tourism activities in the hotspot area of Peru are related to (a) cultural tourism that is built around internationally renowned Incan and pre-Incan architecture and archaeological ruins and other national monuments (*e.g.*, Machu Picchu, Ollantaytambo, Caral), (b) ecotourism and nature tourism that tends to be associated with public and private protected areas and/or (c) extreme sports such as mountaineering, mountain biking and white-water rafting. Tourism in Peru creates collaborative opportunities for conservation in KBAs such as Alto Mayo in San Martin, Kosnipata Carabaya and Cordillera de Vilcanota in Cuzco, and Chachapoyas. Of all the hotspot countries, Peru has long been the leader in tourism infrastructure, visitation rate and tourism-related income for all three types of tourism, and continues to see growth in this sector.

In Venezuela, national parks cover an enormous percentage of the country's land area, but the country's current political and economic instability is not conducive to international tourism. The country's three KBAs are national parks and monuments located relatively close to Caracas, the country's capital.

5.5 Land Use

The expansion of the agricultural frontier transformed Tropical Andean landscapes since pre-Incan times but particularly since the Spanish Conquest (see Table 5.2). By the 1900s, inter-Andean valleys had already been largely converted to croplands, and páramos and *Polylepis* forests of the central Andes had been affected by hundreds of years of anthropogenic fires and over-grazing that altered their boundaries and reduced biodiversity. In the second half of the 20th century, the drivers of land-use change were family and community production of mixed crops, commercial production of monocultures (e.g., potatoes, corn, wheat and barley) and extensive cattle pastures that caused the disappearance of most remaining montane forests and pushed subsistence farmers to marginal areas (Suárez et al. 2011). Frequently, poor agriculture and livestock practices led to forest degradation, soil erosion and increased siltation in water bodies. Agrarian land reform that occurred in Bolivia, Chile, Ecuador and Peru during this period had important social, economic, political and environmental impacts as summarized in Table 5.11.

Table 5.11. Agrarian Land Reform in Four Hotspot Countries

Country	Years	Summary of Agrarian Reform
Bolivia	1952	Indigenous farmers seized the highland haciendas where they worked and claimed the land as part of their communities. The government legalized the land seizure to avoid political fallout. Farmers did not have the capacity to profitably manage their new land and production declined with disastrous financial results. With agrarian reform in the Andes, occupation of the land in the lower eastern part of the country began by converting vast forested areas to agricultural land that began to be inundated by settlers migrating from the densely populated highlands.
Chile	1962-1970	Approximately half of all agricultural land, most of which had previously been owned by large landowners, was covered by the agrarian reform. Semi-feudal relations were abolished. Following the 1973 coup (led by Pinochet), one third of the expropriated haciendas were returned to former owners, one third remained with private capitalists and the final third stayed with peasant farmers as individual plots.
Colombia	Present	Land distribution in Colombia is among the most unequal in the world, with 52% of farms in the hands of just 1.15% of landowners, according to a study by the UNDP. Around 6.5 million hectares of land was stolen or abandoned between 1985 and 2008 as a result of the conflict. That reversed small land-reform efforts in the past. Landowners have filed complaints accusing the FARC of seizing 807,000 hectares, either by forcing them to sell or driving them off with death threats. The government is trying to return much of their land to those who fled, even if they never held formal title to it, under an ambitious land-restitution scheme that has received more than 26,600 claims, totaling just under 2 million hectares, in a little over a year.
Ecuador	1964 -1979	The Land Reform and Colonization Law was applied in the highlands in 1964. The reform was not more radical due to the lack of a national indigenous movement to push for more demands. In 1973, the military government enacted another agrarian reform on the coast. Landowners became cooperative owners but most cooperatives did not work. Despite this, Ecuador's land reform succeeded in terms of forcing landowners to improve the efficiency of their operations to avoid expropriation by the government. This brought about changes in the Ecuadorian agrarian structure: medium sized farms employing modern commercial agriculture were favored over large properties; at the same time, small farms remained for traditional mixed crops (similarly in Bolivia and Peru). In 1979, another law ended agrarian reform.
Peru	1968-80	Rapid urbanization, indigenous farmers demanding more land and better working conditions, and the waning influence of landowners all led to land reform. Agrarian reform had a big impact on the prevailing land ownership structure: large haciendas that concentrated land ownership were abolished; semi-feudal relations in rural society were eliminated; and new ways of managing agrarian production were adopted. All large haciendas were expropriated and there was limited opposition by former landowners. Haciendas were transformed into production cooperatives, their new owners being former workers. After a few years, however, the majority of these cooperatives failed. Finally, haciendas were divided by cooperative members into family plots.

Source: Eguran 2005 (Bolivia, Chile, Ecuador, Peru); The Economist 2012 (Colombia).

Today, inter-Andean valleys and slopes are fully cultivated and few remnant forests remain outside of protected areas. Transformation of natural environments has been particularly severe in areas with fertile volcanic soils. Examples of KBAs on fertile agricultural soils outside of protected areas are two in the Cotopaxi-Amaluza corridor of central Ecuador: Montañas de Zapote-Najda and Yunguilla. In high elevation páramo ecosystems, scientific evidence suggests that the quality and quantity of water emanating from Andean catchments has been affected by human intervention (Buytaert *et al.* 2006). On mid-elevation and lower slopes within the hotspot, land conversion continues for pastures, cultivation of commercial crops and coffee (and cocoa) agroforestry systems among other production activities. Promotion of improved agricultural and livestock practices are essential to protect healthy watersheds and the services they provide, including water provision, biodiversity conservation, slope stabilization and scenic beauty.

Primary, Regenerated and Planted Forests

The data presented in Table 5.12 indicate the relative importance of natural primary forests versus regenerated forests and tree plantations in each hotspot country. It is clear that natural primary forest predominates in Peru (89 percent) and Bolivia (65 percent), is equivalent to regenerated forest in Ecuador, and scarce in Colombia (14 percent) and Argentina (6 percent). Among hotspot countries, Chile has the highest percentage of tree plantations (15 percent), although none of them occur in the area of the hotspot.

Table 5.12. Percent Cover of Natural Forests and Plantations in Hotspot Countries

Type of Forest (% of total)	Country[1]						
	Argentina	Bolivia	Chile	Colombia	Ecuador	Peru	Venezuela
Primary	6	65	27	14	49	89	ND
Regenerated	89	35	58	85	50	10	ND
Planted	5	0	15	1	2	1	ND

Source: Global Forest Watch 2014
[1]Data are for the whole country and not restricted to the hotspot area.
ND=No data

To maintain environmental integrity, conserve biodiversity and other ecosystem services, all hotspot countries have designated large areas of their natural landscapes with some category of legal protection (See Tables 4.12a and 4.12b for protected area coverage within the hotspot). Under the UN Millennium Development Goals, the proportion of protected areas at the national level is an indicator for environmental sustainability. Both Venezuela (49.5 percent) and Ecuador (37.1 percent) have more than one third of country's area under legal protection while Argentina lags behind with only 6.6 percent of its area within the government's protected area system (CEPALSTAT 2014).

Ecological Footprint

Most Tropical Andes Hotspot countries have not carried out ecological or carbon footprint analyses to compare human consumption with nature's ability to provide services to compensate for this consumption. Environmental agencies in some hotspot countries (*e.g.,* Ecuador, Peru) have recently invested in major nationwide efforts to calculate natural forest-based carbon as a strategic component in developing national Reducing Emissions from Deforestation and Forest Degradation (REDD) strategies, and some countries have isolated data on greenhouse gas emissions, usually associated with large companies in large cities.

Comparative data among hotspot countries of forest-based carbon and greenhouse gas emissions resulting from land-use change and forestry are presented in Table 9.4. These data indicate that for three countries (Ecuador, Bolivia and Peru) forest-based greenhouse gas emissions (*i.e.* emissions resulting from deforestation and/or forest degradation) are greater than 45 percent of their respective national totals, underscoring the importance of deforestation in the ecological footprints of those countries.

Water use in the Andes is inefficient, and water footprinting is gaining traction in the region. Although agriculture is the major water user, consumption for manufacturing is increasing. For example, the beverage industry, such as South African Breweries which owns beer companies in Colombia, Ecuador and Peru, is developing a program called Water Futures with GIZ (the

German Society for International Cooperation) to measure their water footprint. The Swiss Development Corporation has a global project that includes measuring the water footprint of a select group of companies in Chile, Colombia and most recently Peru. The Science and Technology Center of Antioquia calculated the water footprint for the Porce watershed in northwestern Colombia, from the Andes around Medellin to the outflow into the Darien Gulf in the Caribbean (CTA 2012). WWF is currently developing the water footprint for Peru.

As the effects of climate change are felt, water related risks are gaining attention in the region. Despite great uncertainty, climate change will pose additional pressure on water-stressed areas, such as the coast of Peru and Chile; as well as additional rain in flood-prone areas. Adaptation measures are being discussed, such as wetland conservation, reforestation and payment for watershed services measures, though investment is still limited.

6. POLICY CONTEXT OF THE HOTSPOT

6.1 Political Conditions and Trends

Current governments in the hotspot represent a diverse spectrum of political and economic systems and visions, though all are democracies with by-and-large stable national governments. Ecuador, Bolivia, Argentina and Chile have re-elected presidents, and political continuity in the region has been a factor favoring the consolidation of environmental programs and policies.

Despite the political diversity of the region's current governments, all share a marked emphasis on export commodities (especially non-renewable resources) as a key driver for economic development. The strength of the export commodity sector has played a particularly important role in expanding public budgets and increasing investment, spending and services.

Venezuela, Ecuador, Bolivia and Argentina have focused strongly on increasing state control in key sectors including hydrocarbons, mining, infrastructure and energy, with reforms favoring greater governmental participation through public investment and royalties. Commodity exports, specifically oil, gas and agriculture, play a large role in the public finances of these countries, underpinning significant social spending.

Colombia, Peru and Chile exhibit a different tendency, with a stronger emphasis on private investment and the market economy. All three countries favor open markets (as evidenced by trade liberalization agreements with the United States), an ambitious process of tariff reductions with the Pacific Alliance and very significant flows of foreign direct investment.

As described in Chapter 5, an important trend in all countries of the region is the growth of the middle class, creating both challenges and opportunities for environmental policy and governance (Cárdenas *et al*. 2011 and World Bank 2013). On the one hand, a growing, educated and politically engaged urban population is increasingly demanding and concerned with environmental issues. At the same time, burgeoning consumption, demand for social programs and public expenditure put increased pressures on resources and governments that have intensified resource extraction to finance spending on infrastructure and social programs.

Social and environmental conflicts have accompanied the fraught process of reconciling resource-driven national economic development with local and long-term interests. In Colombia, for example, the signing of a Trade Promotion Agreement with the United States triggered a nation-wide agrarian strike in 2013, fueled by concerns about the agreement's impacts on small farmers and forests, paralyzing large areas of the countryside for three weeks. Similarly, indigenous-led protests in Peru, which lead to numerous deaths in the Amazonian town of Bagua (see Chapter 5), were ignited by opposition to the forestry provisions of that country's free trade agreement with the United States and proposed changes in collective land rights, among other factors. Measures whereby native community members would be able to sell their land without full approval of their general assemblies and/or other governance structures were viewed as a threat to territorial integrity, already in peril by increasing pressures from oil, mining, timber and large-agricultural interests. In Bolivia, the emblematic case of a Brazilian-financed road project that would slice through indigenous lands and a national park (*Territorio Indígena y Parque Nacional Isiboro Secure-TIPNIS*) generated fierce resistance and a national protest, and continues entangled in a complex and contentious process of negotiation and public consultation.

Governmental intervention in the economy in some countries has expanded in tandem with greater regulation of civil society and the press. Such intervention is discussed in greater detail in Chapter 7 which addresses the regulatory framework for civil society, especially NGOs.

Security has improved, and violence declined, in some parts of the hotspot over the last decade, especially Colombia. But safety is still an issue for work in many areas in the hotspot. Urban centers and many of the rural areas critical for biodiversity conservation are seriously affected with high levels by of homicide, robbery, and kidnapping, often associated with organized crime and drug trafficking (SISLAC-FLACSO 2013). In KBAs such as the Cotacachi Cayapas in Ecuador, the Yungas Superiores de Carrasco in Bolivia, and all KBAs in Venezuela, insecurity is sufficient to hinder conservation work. The KBA prioritization process detailed in Chapter 12 took into consideration relative scores of violence and insecurity in the hotspot. The current situation in Colombia warrants a special mention. After over fifty years of armed conflict, peace negotiations currently underway between the government and the insurgency, though still fragile, hold out hope for dramatic change in Colombia. A successful peace negotiation could open the doors to a revitalized civil society, better environmental governance and increased opportunities for research and management in areas long affected by violence. Conversely, without effective environmental governance and investment, peace will likely lead to an increase in pressures on ecosystems and resources in the countryside as many of Colombia's internal refugees return and new rural investment expands. To note, Colombia has one the highest rates of internal displacement globally, with over 3 million displaced people officially registered (USAID 2010), many having migrated to cities. KBAs in the Northeastern Cordillera are likely to be most affected by the return of displaced families.

6.2 Policy, Legal and Institutional Frameworks

Global and Regional Agreements

All hotspot countries have ratified the principal international environmental treaties, including the United Nations Framework Convention on Climate Change, Convention on Biological Diversity, Convention on International Trade in Endangered Species (CITES), the Ramsar Convention on Wetlands, and the Convention Concerning the Protection of World Cultural and Natural Heritage (Table 6.1). Several *Memoranda of Understanding* under the Convention on Migratory Species have been signed by hotspot countries, including for migratory grassland birds and their habitats (Bolivia and Argentina) and for the conservation of high Andean flamingos and their habitats (Bolivia, Argentina, Chile and Peru). Under the CITES framework, a regional agreement for the conservation and sustainable management of the vicuña has been implemented by Argentina, Bolivia, Chile, Ecuador and Peru.

Table 6.1 Hotspot Parties to Global Environmental Agreements

Countries	Environmental Agreements								Number of agreements
	CBD	CITES	CPB	UNFCCC-KP	UNFF	WHC	CMS	Ramsar	
Argentina	Y	Y	N	Y	Y	Y	Y	Y	7
Bolivia	Y	Y	Y	Y	Y	Y	Y	Y	8
Chile	Y	Y	N	Y	Y	Y	Y	Y	7
Colombia	Y	Y	Y	Y	Y	Y	Y	Y	8
Ecuador	Y	Y	Y	Y	Y	Y	Y	Y	8
Peru	Y	Y	Y	Y	Y	Y	Y	Y	8
Venezuela	Y	Y	Y	Y	Y	Y	Y	Y	8

Y=party to agreement, N=not a party; CBD=Convention on Biological Diversity; CITES=Convention on International Trade in Endangered Species; UNFCCC KP=United Nations Framework Convention on Climate Change - Kyoto Protocol; CPB=Cartagena Protocol on Biosafety; UNFF=United Nations Forum on Forests (all UN member states); UNCCD=UN Convention to combat desertification; WHC=World Heritage Convention; CMS=Convention on Migratory Species; Ramsar=Convention on Wetlands of International Importance

Under the Convention on Biological Diversity (CBD), countries in the hotspot have taken important normative, policy and strategic measures for its implementation. National Biodiversity Strategies and Action Plans (NBSAPs) are the main instrument for the implementation of the CBD and all hotspot countries have Biodiversity Strategies since 2001. During the Conference of the Parties in 2010, countries agreed to update their NBSAPs under the framework of the 2011-2020 Strategic Plan for Biodiversity that includes twenty headline Aichi Biodiversity Targets. To date, Colombia and Venezuela have concluded the process of updating their NBSAPs with other hotspot countries making important progress in updating their strategies for the next Conference of the Parties of the Convention in 2014. High priority biodiversity areas identified in NBSAPS were solicited at the consultation workshops to inform KBA delineation and prioritization.

Under the Ramsar Convention on Wetlands, countries in the hotspot have designated a total of 85 Ramsar sites that represent an area of over 28 million hectares, including the recent addition of three new sites in 2013 by Bolivia. Forty-four of these Ramsar sites are located within the hotspot, of which 29 are included within KBAs. Table 6.2 lists KBAs with RAMSAR sites within their boundaries. Hotspot countries have also designated 44 sites under the Convention Concerning the Protection of the World Cultural and Natural Heritage (UNESCO/WHC) and 42 sites as Man and the Biosphere Reserves (MAB).

Table 6.2 KBAs with Ramsar sites within their boundaries in the Hotspot countries

KBA name	Country
Sistema de lagunas de Vilama-Pululos	Argentina
Laguna Grande	Argentina
Laguna Purulla	Argentina
Reserva Provincial y de la Biosfera Laguna Blanca	Argentina
Monumento Natural Laguna de Los Pozuelos	Argentina
Lago Titicaca (Bolivian side)	Bolivia
Lagunas Salinas del Suroeste de Potosí	Bolivia
Lago Poopó y Río Laka Jahuira	Bolivia
Reserva Biológica Cordillera de Sama	Bolivia
Parque Nacional Salar de Huasco	Chile
Monumento Natural Salar de Surire	Chile
Laguna de la Cocha	Colombia
Parque Nacional Natural Chingaza	Colombia
Parque Nacional Podocarpus	Ecuador
Parque Nacional Llanganates	Ecuador
Cajas-Mazán	Ecuador
El Angel-Cerro Golondrinas	Ecuador
Bosque Protector Colambo-Yacuri	Ecuador
Lago de Junín	Peru
Lagunas de Huacarpay	Peru
Ramis y Arapa (Lago Titicaca, Peruvian side)	Peru

At the regional level, international political and economic integration includes advances and serious challenges. Over the past decade the countries in the hotspot have intensified economic integration through a number of strategies and mechanisms such as regional trade agreements, which include free trade agreements, customs unions and common markets. The nature of these strategies and their level of implementation depend on the political agenda of the individual countries. Chile is the country with the most free trade agreements in accordance with its trade liberalization policy. Colombia and Peru have recently ratified free trade agreements with both the United States and the European Union. These agreements will have important effects on the agricultural sector of both countries. In preparation for these agreements, both countries have established fiscal incentives to promote modernization and increase competitiveness. Agreements also include some environmental guidelines, such as the establishment, in Peru, of an Environmental Affairs Council (*Consejo de Asuntos Ambientales*) with the purpose of working on an Environmental Commercial Agreement (*Acuerdo Comercial Ambiental* - ACA). Section 6.7 discusses agricultural policies related to free trade agreements.

A number of regional organizations have diverse (and sometimes divergent) agendas with overlapping memberships (see Table 6.3). ALADI – the Latin American Integration Association

– created in 1980 is the region's oldest organization for commercial integration. All countries in the hotspot are member states; however, ALADI's influence has lessened with the establishment of other international fora. The Andean Community of Nations (*Comunidad Andina de Naciones*–CAN), traditionally a key forum for regional policy and economic integration, was considerably weakened by the departure of Venezuela in 2006. The Pacific Alliance, which includes Colombia, Peru and Chile (as well as Mexico), is a common-market initiative established in 2007 that aims for greater commercial integration and trade liberalization. ALBA (*Alianza Bolivariana por los Pueblos de Nuestra América*) is an alternative and left-leaning grouping that includes Ecuador, Bolivia and Venezuela. MERCOSUR – the Southern Common Market – is the largest South American trading block, and includes Argentina, Venezuela and Bolivia (in process of ratification) with Chile, Colombia and Ecuador affiliated as associated states. This kaleidoscope of organizations and diversity of political positions has made achieving regional consensus on environmental issues difficult today, in contrast to CAN's previous successes as a forum for developing shared policy and regulatory frameworks for biodiversity.

The Union of South American Nations (UNASUR), established in 2008, is emerging as perhaps the most important organization for regional integration. It plays a pivotal role, particularly in infrastructure development, officially aiming to provide continuity and support for the Initiative for the Integration of the Regional Infrastructure of South America (IIRSA), the ambitious continent-wide program of integrated transportation, energy and telecommunications projects. With its far-reaching infrastructure impacts, UNASUR and IIRSA represent important opportunities for incorporating a biodiversity agenda into regional development policies. A detailed discussion on IIRSA's governance is found in section 6.7 in this chapter.

Table 6.3 Hotspot Parties to Regional Economic and Political Integration Agreements

Countries	ALADI	CAN	Pacific Alliance	ALBA	MERCOSUR	UNASUR
Argentina	Member	Not a member	Not a member	Member	Member	Member
Bolivia	Member	Member	Not a member	Member	Ratification in process	Member
Chile	Member	Not a member	Member	Not a member	Associate state	Member
Colombia	Member	Member	Member	Not a member	Associate state	Member
Ecuador	Member	Member	Observer state	Member	Associate state	Member
Peru	Member	Member	Member	Not a member	Associate state	Member
Venezuela	Member	Not a member	Not a member	Member	Member	Member

ALADI= Latin American Integration Association; CAN= Andean Community of Nations; ALBA= Alianza Bolivariana por los Pueblos de Nuestra América; MERCOSUR = Southern Common Market; UNASUR = Union of South American Nations.

Governance Structures and Decentralization

All hotspot countries except Argentina are unitary states meaning that the central government is supreme, establishing public policies for biodiversity conservation and development that are executed at the subnational level, with some functions selectively delegated. Argentina is a federal state, with provincial governments holding broad powers over their territory and responsibility for administrative decisions on environmental matters in consultation with the central government.

While biodiversity policy frameworks are set by national governments (with the exception of the Argentina's federal system), since the 1990s there has been a growing trend towards decentralization, with the formal transfer of responsibilities and powers to regional and local governments. Colombia and Bolivia stand out as early movers, with Colombia's 1991 Constitutional assembly and Bolivia's 1994 Law on Public Participation as key milestones.

The aim of decentralization was to facilitate local action for more effective policy and program implementation. Although the speed and nature of this process have varied, across the hotspot countries there is a growing capability of subnational governments (states, provinces, departments or municipalities) to engage in territorial planning and environmental management. Illustrative are successfully functioning water funds in cities such as Cali, Bogotá and Quito, as well as others recently installed in Lima and other medium to small cities in the hotspot such as Loja in Ecuador. The experience of these strategic conservation mechanisms is discussed in detail in Chapter 10.

Over the last decade or more, CEPF and national counterparts have created innovative experiences that engaged subnational governments, civil society organizations and local populations in sustainable land use planning that could serve as models for future investments in the hotspot. Two examples of this are: (1) the BioCorridor Strategy for the Cotacachi Cayapas KBA in Ecuador where conservation planning is being carried out by four provincial governments (Esmeraldas, Imbabura, Carchi and Sucumbíos) and three distinct ethnic groups (Afro-descendant, Chachi and Awá) along with international, national and local civil society organizations (Conservation International, Fundación Altrópico) and (2) work with local governments and communities in Madidi and Pilón Lajas in Bolivia to strengthen protected areas and indigenous territories. Partners in these initiatives included FUNDESNAP and the Tsimane Mosetén Regional Council (CRTM), the Federation of Municipal Authorities of Bolivia (FAM) and the National Protected Areas Service (SERNAP).

Despite the positive trend many, if not most, subnational governments continue to face challenges in terms of budgets and institutional capacity to fully exercise these new responsibilities. Table 6.4 summarizes the key types of subnational governments in the hotspot.

Table 6.4. Political-Administrative Divisions of each Country within the Tropical Andes Hotspot

Political-Administrative Units	**Country**						
	Argentina	**Bolivia**	**Chile**	**Colombia**	**Ecuador**	**Peru**	**Venezuela**
Unit name	Province	Department	Region	Department	Province	Department	State
Total number in country	23	9	15	32	24	24	23
Number that are wholly or partially within the hotspot	6	8	3	25	19	24	18

Below are brief summaries of the institutional structure for the environment and biodiversity in each of the hotspot countries, highlighting trends and opportunities for engagement.

Argentina
Given the federal nature of the country, environmental governance in Argentina is decentralized. According to the National Constitution, the provinces have jurisdiction over their renewable (forests, biodiversity, water) and non-renewable (hydrocarbons, mining) natural resources, while the national government – in agreement with provincial legislatures – is charged with establishing legislation on minimum budget requirements for environment and natural resources. The Secretariat for Environment and Sustainable Development (*Secretaría de Ambiente y Desarrollo Sustentable* – SayDS) is the federal institution responsible for developing and implementing environmental policy at the national level and coordinating with provincial environmental authorities. While certain themes (*e.g.*, forests, glaciers) are subject to national laws ensuring budget minimums to be followed by the provinces, other key areas for conservation (*e.g.*, protected areas, wetlands) are not, resulting in considerable variation in funding among provinces.

The management and conservation of certain species declared "national monuments" are regulated at the national level. In the hotspot area these are vicuña, Andean deer or *taruca* (*Hippocamelus antisensis*) and jaguar (*Panthera onca*). All other species are regulated under provincial legislation and regulation, as is also the case for non-renewable natural resources. More detailed discussion on protected areas governance in Argentina, and the other hotspot countries, is found in section 6.6.

Participants at the national consultation workshop as well as other experts that were consulted emphasized that the environmental authorities in the hotspot provinces in Argentina (often described as the *Noroeste Argentino* or NOA), face limitations in their institutional capacity, especially in budget and staffing. In addition, the provincial conservation authorities often face contradictory policies regarding extraction of natural resources, especially mining, enacted by the sectorial provincial institutions.

The provincial environmental authorities of Salta and Jujuy are actively engaged in co-management of the Yungas Biosphere Reserve, part of the Tucuman-Yungas Corridor (see Chapter 4), where logging, mining and agricultural activities are significant pressures. To confront these conflicts a multi-stakeholder forum has been established to support sustainable landscape planning and conservation.

Bolivia
The new paradigm of "good living" (*vivir bien*) adopted by the Bolivian government and enshrined in the Constitution is driving an ongoing process of revision and reform of national environmental policy. As a result, in 2012 the Mother Earth Law (*Ley de la Madre Tierra*) was enacted, creating a novel framework that aims to harmonize the "good living" principles of development with the capacity of living ecosystems.

The Ministry of Environment and Water is the national institution charged with environmental planning, policy and management. The Vice-ministry for Environment, Biodiversity, Climate Change and Management and Development of Forests (VMA) acts as the national authority for biodiversity and protected areas and supervises the national system of protected areas through the National Protected Areas Service (SERNAP). In 2012, departmental governments were empowered to manage protected areas in order to improve their administration. Shortfalls of funding, however, are still pervasive especially due to continuous budget cuts affecting SERNAP.

The enactment of the Mother Earth Law has also strengthened the decentralization and autonomic movement. Subnational governments (departments and municipalities) are strengthening their legislative frameworks (*estatutos autonómicos and cartas orgánicas*) with greater authority for landscape planning, sustainable use and conservation.

Joint management ("*gestión compartida*") of all protected areas that overlap with indigenous territories is an important mechanism stemming from Bolivia's recent regulatory framework, in practice affecting nearly all of the country's protected areas. Joint management of Indigenous and Community Territories (*Territorios Comunitarios de Origen*) involves areas such as the Tacana and Amboró KBAs where the Santa Cruz Government is actively involved. Previous CEPF investment has served to catalyze collaboration, and offers important lessons for future work in the KBAs identified in the Madidi-Pilón Lajas-Cotapata Corridor.

Environmental licensing responsibilities for low-risk projects (those not requiring Environmental Impact Assessments) were transferred to departmental and municipal governments in 2011 (Supreme Decree No. 902) in order to streamline review processes and speed up public investment in projects. Since 2008, road construction has been the largest sector of public investment in the country and has led to conflicts with indigenous territories (*e.g.*, TIPNIS). Environmental authorities both at national and subnational levels often lack the institutional capacity and power to significantly shape the national government´s public works agenda. Further discussions of infrastructure development policies affecting Bolivia as well as the other hotspot countries can be found in section 6.7.

Chile

In Chile, the Ministry (and Subsecretariat) of Environment, the Ministerial Council for Sustainability (*Consejo de Ministros para la Sustentabilidad*) and the Consultative Council of the Ministry of Environment are the central government entities that play key roles in environment and biodiversity issues. The Ministry (and Subsecretariat) of Environment, leads environmental policy implementation through the administration and protection of natural resources. The Ministerial Council and the Consultative Council are entities where the environmental policy is formulated and discussed with the involvement of diverse sectors and stakeholders. The Ministerial Council includes delegates from diverse sectors of the executive branch: Agriculture, Treasury, Health, Economy, Transport, Energy, Public Works, Mines and others; while the Consultative Council has a multi-stakeholder representation (*i.e.*, academia, NGOs, private sector and labor). Although other countries in the hotspot have similar arrangements on paper, in Chile these are actively working and offer opportunities to mainstream conservation.

Biodiversity, protected areas and environmental impact assessment are areas managed by autonomous governmental services. The Biodiversity and Protected Areas Service (*Servicio de Biodiversidad y Áreas Protegidas*) is in charge of the National System of Protected Areas (*Sistema Nacional de Áreas Silvestres Protegidas del Estado* – SNASPE), currently attached to the National Forestry Corporation (CONAF).

Environmental policy in the regions is supervised by Regional Ministerial Secretariats (*Secretarías Ministeriales Regionales*), which are entities of the Ministry of the Environment that coordinate policy implementation at subnational levels. These Secretariats are responsible for collaborating and providing support to regional and municipal governments in order to incorporate environmental considerations into their plans and strategies.

The Environmental Superintendence and Environmental Tribunals carry out environmental enforcement in Chile. These enforcement functions are institutionally separate and independent from the policy and programmatic functions of the Ministry of Environment.

Colombia
Natural resource and environmental management are organized in Colombia in the National Environmental System (*Sistema Nacional Ambiental* – SINA), which in principle integrates all national, regional and local agencies responsible for environmental affairs. Although the SINA is now over 20 years old, it has gone through frequent restructuring and still has limitations, especially in regards to policy enforcement.

The lead entity for environmental policy is the Ministry of Environment and Sustainable Development (*Ministerio del Ambiente y Desarrollo Sostenible* – MADS), which presides over the SINA. This ministry was created relatively recently (2008) and is still in a process of consolidation. The MADS sets environmental policy and participates in diverse regional planning forums to integrate these policies into other sectors. The SINA also includes:

- Regional corporations (*Corporaciones Autónomas Regionales* – CAR), environmental authorities with jurisdiction over specific territories established based on both political-administrative and ecological boundaries;
- Departments and municipalities;
- Public research institutions, which for the hotspot include the Alexander von Humboldt Institute, the Pacific Environmental Research Institute (for the Pacific slope of the Andes), the Sinchi Amazon Institute of Scientific Research (for the Amazon slope of the Andes) and the Institute of Hydrology, Meteorology and Environmental Studies (IDEAM) and the Research and Studies Center on Biodiversity and Genetic Resources (CIEBREG);
- The Administrative Unit for the System of National Parks, under the MADS but with a high degree of autonomy; and
- NGOs, whose missions include conservation and natural resource management, as well as civil society reserves (non-governmental protected areas) registered with the national parks system and environmental funds (*e.g.*, *Fondo de Patrimonio Natural*, *Fondo para la Acción Ambiental y la Niñez*) that are associated with protected area financing.

The Autonomous Regional Corporations (CARs in Spanish) play a key role for conservation and biodiversity, having authority over important aspects of territorial planning, enforcement and management in their jurisdictions. While several Autonomous Regional Corporations have strong institutional capacity, many still have significant gaps. In recent years, Autonomous

Regional Corporations have seen their budgets suffer as legal reforms reduced their share of oil and mining revenues, historically an important source of funding for these entities, as well as for conservation and land management.

Other national entities are responsible for licensing and oversight of mining and oil development, including the National Environmental Licensing Agency (ANLA), the National Mining Agency (ANM) and the National Hydrocarbon Agency (ANH).

Ecuador

The Ministry of Environment (MAE) is the lead environmental institution in Ecuador, with regional offices in the provinces. Natural heritage ("*patrimonio natural*" *i.e.,* biodiversity, protected areas, forestry), climate change and environmental quality are managed directly by the MAE at the national level. Water resources are managed by the National Water Secretariat (SENAGUA), while plantation forestry is under the purview of the Ministry of Agriculture, Livestock, Aquiculture and Fisheries (MAGAP).

In 2012, Ecuador established a National Decentralization Plan (2012-2015). This plan created new responsibilities and powers for provincial, municipal and parish governments (denominated Autonomous Decentralized Governments or GADs), including territorial planning and zoning and the creation of protected areas within their jurisdictions. This process of delegation and devolution is ongoing, with the transfer of authority being evaluated on a case-by-case basis according to institutional capacities for environmental, natural resource and watershed management. As mentioned previously, decentralization processes have increased interest in sustainable landscape planning. Experiences in KBAs and corridors in the northwestern region (provinces of Esmeraldas, Imbabura and Carchi), in areas of the Sumaco Biosphere Reserve (provinces of Orellana, Napo and Pastaza) and the Podocarpus Biosphere Reserve (provinces of Loja and Zamora) have engaged local governments and multiple stakeholders for better sustainable land-use management.

Ecuador's Constitution (2008) includes key provisions relating to the environment, particularly the concept of "living well" (*buen vivir*) as a development pathway that sustainably balances material and other human needs. The Constitution also defines "Strategic Sectors" (including biodiversity and genetic resources as well as energy, non-renewable natural resources, transportation, oil refining, and water) as being under the exclusive control of the central government. The Ministry of Environment administratively became part of the group of government agencies coordinated by the Ministry of Strategic Sectors in 2013. This move both highlights the importance of environmental issues, while at the same time subsuming the MAE within a group of generally more powerful ministries responsible for high-impact development activities.

Peru

The Ministry of Environment (MINAM) was created in 2008 and is the national entity charged with matters pertaining to the environment, including policies and management of natural resources. MINAM is the national focal point for the United Nations Conventions on Climate Change and Biological Diversity.

The National Protected Areas Service (*Servicio Nacional de Áreas Naturales Protegidas* - SERNANP) is part of MINAM and is responsible for the national system of protected areas. SERNANP manages national protected areas directly or can delegate this function to third parties under various mechanisms, as well as approving management instruments for regional and private protected areas.

The Ministry of Agriculture and Livestock (*Ministerio de Agricultura y Ganadería* – MINAG) also plays a key role in policy setting, enforcement and implementation of programs for forests and wildlife through its General Directorate for Forest and Wildlife (*Dirección General Forestal y de Fauna Silvestre* – DGFFS). It also acts as the Management Authority for CITES.

Peru is engaged in an active process of decentralization wherein MINAG is transferring many DGFFS functions, in particular permitting and concessions for sustainable use and conservation of forests and wildlife, to regional governments. The National Forestry and Wildlife Service (*Servicio Nacional Forestal y de Fauna Silvestre* – SERFOR) is the specialized governmental agency in charge of promoting decentralization and strengthening the capacity of forestry authorities in the regions. San Martín, Madre de Dios and Cuzco stand out as regions developing institutional and regulatory capacity for environmental affairs, having established Regional Environmental Authorities (*Autoridades Regionales Ambientales* – ARA) for planning, management and enforcement in their jurisdictions.

In July 2014, in response to pressure to increase economic growth, the Peruvian government enacted a new law to accelerate environmental review of development projects and lower fines for environmental violations (Environmental Watch 2014). The law strips the environment ministry of jurisdiction over air, soil and water quality standards, and eliminates their power to establish nature reserves exempt from mining and oil drilling.

Venezuela

Venezuela has an ample regulatory framework that supports conservation. Sustainable development is integral to national development planning policies. Laws about biodiversity, forest resources and wildlife have all been enacted in the past decade. Natural resource management and conservation are primarily the responsibility of central government institutions, including (historically) the Ministry of Environment, Ministry of Science and Technology and the Ministry of Agriculture and Land. The National Parks Institute (*Instituto Nacional de Parques* – Inparques) is under what was the Ministry of Environment and is responsible for management of national parks, monuments and areas under special administration (*Áreas Bajo Régimen de Administración Especial* – ABRAE). Special administration areas correspond to national territorial development goals for production, recreation and protection. INPARQUES and its offices at subnational levels oversee environmental regulations that correspond to each of these protection categories. In September 2014, the government issued a decree that eliminated the Ministry of the Environment, converting it into Vice Ministry within the Ministry of Housing, Habitat and Ecosocialism. The administrative change has the effect of lessening environmental oversight of development and other initiatives.

State governments frequently have Departments of the Environment and of Social Development that implement projects locally. Municipalities have limited involvement with conservation; their engagement in environmental programs is usually limited to solid waste management. However, as mentioned in Chapter 4, the Cordillera de la Costa Central and Turimiquire KBAs are key for water provisioning to coastal cities. State and municipal authorities contribute to water management in these areas, providing an opportunity for partnerships to strengthen conservation efforts.

6.3 Indigenous territories and land rights

Convention No. 169 of the International Labor Organization (ILO) concerning Indigenous and Tribal Peoples in Independent Countries is a key legal touchstone for indigenous policy and legislation in the hotspot. The Convention requires ratifying states to identify indigenous lands, guarantee the effective protection of ownership and possession rights, safeguard indigenous rights to participate in the management and conservation of resources, and consult with them over mineral or subsoil resources. Although all of the hotspot countries have ratified this legally binding convention, its translation into national policy is still a work in progress. Peru is perhaps the most advanced country in incorporating the Convention into national legislation by passing the Law on Prior Consultation in 2011, which requires that indigenous communities be consulted prior to the implementation of infrastructure and extractive projects in their territories. This law is now being applied to the numerous logging and mining concessions and oil and gas developments underway.

In addition to the International Labor Organization Convention 169, the majority of hotspot countries have adopted legislation to strengthen public participation in decision-making processes. These laws extend to indigenous peoples, giving them the right to participate in decisions about projects that will take place in their territories. Their views are non-binding in these fora, resulting in projects still taking place in spite of local opposition. Constitutional reforms in Venezuela, Ecuador and Bolivia are marked by a focus on guaranteeing rights for indigenous peoples including significant provisions for conservation and protection of biodiversity. Bolivia has a legal mechanism (*Territorios Comunitarios de Origen*) to create protected areas that overlap with indigenous communities.

Hotspot countries have developed policies to guarantee the rights of indigenous peoples, making significant progress in recent years in land titling, territorial recognition and mechanisms for local governance. Examples include special indigenous jurisdiction in Colombia, *Circunscripciones Territoriales Indígenas* in Ecuador, and *Tierras Comunitarias de Origen* in Bolivia. Table 6.5 summarizes the legal status given to indigenous territories and major aspects of their regulatory and institutional framework.

Table 6.5. Legal Status of Indigenous Territorial Recognition in Hotspot Countries

Country	Legal status given to indigenous territories	Legal framework for indigenous territories

Country	Legal status given to indigenous territories	Legal framework for indigenous territories
Argentina	*Tierras de comunidades indígenas, aborígenes u originarias*	Land titling for indigenous peoples is carried out by the National Institute of Indigenous Affairs (INAI) once an indigenous community has been recognized as a legal entity. Land regularization for indigenous communities has gained momentum since 2006 with the enactment of legislation that strengthened the national registry of indigenous communities and earmarked state funding for land regularization.
Bolivia	*Territorios Comunitarios de Origen* - TCO (*Indígenas y/o Campesinos/Mestizo*)	Indigenous Territories have significant autonomy recognized by various legal bodies (*i.e., Ley Marco de Autonomía*, 2010). This means that indigenous people have the right to manage and govern their territory according to their cultural norms.
Chile	*Tierras Indígenas*	Land titling is carried out by CONADI, the National Council for Indigenous Development, created by law in 1993. Indigenous lands are recognized once the community acquires legal status. Because most of the indigenous population lives in urban settings, CONADI manages funds for land restitution (buying) and habitat restoration so the communities can have access to sufficient land and resources (*i.e.,* water) for their livelihoods.
Colombia	*Resguardos Indígenas, Territorios Colectivos de Comunidades Negras*	Territorial recognition to indigenous groups is given as *Resguardos Indígenas*, which is a figure similar to indigenous reservations in the United States. These have a high level of autonomy and self-governance. They can comprise one or more indigenous groups. The Office for Indigenous Affairs within the Ministry of Domestic Affairs is in charge of policy development and oversight. Afro- descendant populations also have collective territorial and organizational recognition, although with less autonomy than indigenous peoples.
Ecuador	*Territorios de Comunidades Indígenas, Pueblos y Nacionalidades*	The National Council for Indigenous Development (CODENPE) is responsible of the legal recognition of indigenous communities and their collective land titling. Collective territories can be recognized at community, association and nationality levels, depending on the request of the indigenous groups. Although the 2008 Constitution incorporates the notion of Indigenous Territorial Jurisdictions (*Circunscripciones Territoriales Indígenas*) as autonomous and self-governing entities, they have yet to be fully regulated.
Peru	*Comunidades nativas*	The Peruvian State grants legal recognition and land titling to native communities, most of them located on the Amazonian slopes of the Andes. In the highlands, legal recognition and titling is given to rural communities (*comunidades campesinas*). Within the Culture Ministry, INDEPA - the National Development Institute for Andean and Amazonian Indigenous and Afro-Peruvian Peoples - is in charge of policy development and oversight.

Country	Legal status given to indigenous territories	Legal framework for indigenous territories
Venezuela	*Tierras Indígenas*	There are no indigenous groups in the Venezuelan portion of the hotspot. Most indigenous communities are in the Amazon region. It is only recently (2009) that land titling has been granted by the state. The Afro-descendant population that lives in the hotspot region is mostly urban.

Legal demarcation and recognition of indigenous territories has been an area of notable progress, stemming from indigenous demands and political organization that have grown particularly strong since the 1980s. Lands owned or reserved for indigenous peoples and communities total over 82 million hectares, which represents over 52% of the hotspot's land area. Land designated for indigenous people increased by nearly 40 percent between 2000 and 2008 (Rights and Resources Initiative 2009, International Tropical Timber Organization 2009). Government data on titling is often contradictory due to the conflictive land titling and tenure recognition process, overlapping claims, multiple agencies involved and poor records covering often remote areas.

Protected areas overlapping indigenous territories are frequent in the hotspot and potentially can lead to better conservation outcomes than either category alone (Holland 2014), although the situation can also lead to conflicts. Sierra Nevada in Colombia is illustrative of this often-tense relation. Both a national park and home to four indigenous groups (Kogui, Arhuacos, Wiwas and Kankuamos), the area has been plagued by the country's internal armed conflict. Attempts to extend the Park's boundaries to reduce the vulnerability of the indigenous populations to encroachment by colonists and armed groups have been received with skepticism by the indigenous communities. Effective conservation in this area requires well developed strategies that reconcile indigenous autonomy over their territories with governmental conservation authority, a goal that has been difficult to achieve so far.

The hotspot is home to interesting policy developments and experiences reconciling indigenous rights and conservation goals in protected areas. Under Bolivian law, for example, all protected areas overlapping indigenous lands are subject to the principle of shared responsibility and management. In Ecuador, the Cofán indigenous people have used co-management agreements to effectively regain control over hundreds of thousands of hectares of ancestral lands. CEPF´s previous investment in the Tropical Andes Hotspot supported capacity building in various KBAs such as Madidi and Pilón Lajas in Bolivia and Awa territories located along the Ecuador-Colombia border. These experiences have generated important lessons for protected areas co-management through multi-stakeholder dialogue.

Despite these advances, under all the national laws of the hotspot, subsoil resources are property of the State (central, or regional in the case of Argentina), limiting the effective authority of indigenous peoples over hydrocarbon and mineral extraction from their territories. Several KBAs and Corridors experience this situation (*e.g.*, Trinational Puna Corridor shared by Argentina, Chile and Bolivia; the Tucumán Yungas Corridor in Argentina, the Condor-Kutuku-Palanda Corridor in Ecuador and Peru). National infrastructure interests can come into conflict with indigenous territories, as happened in the example of road construction in TIPNIS in Bolivia.

Land rights and tenure regimes

Although there have been positive advances in territorial rights recognition for indigenous peoples and Afro-descendants, land rights remain a critical issue in Colombia, Bolivia, Ecuador and Peru. The grave inequality in land distribution is a common factor in these countries (USAID 2010).

- In Colombia, less than 1 percent of the population owns more than half of the country's agricultural land. Current tax incentives and government subsidies support large landholdings by the well-off, even if it is under-utilized.
- In Bolivia, where only 7 percent of the country's land area (8 million hectares) can be productively used for agriculture, 10 percent of agricultural landholders control 90 percent of that land. An estimated 30 percent of Bolivia's farmers are landless or near-landless and either lease land or work as agricultural laborers
- In Ecuador farms smaller than five hectares comprised 63 percent of all holdings, but occupied 6.3 percent of agricultural land according to the agricultural census carried out in 2000.

Forests, wildlands and other areas of interest for conservation are particularly prone to problems of unclear and unresolved land tenure, giving rise to conflicts and undermining investments in long-term stewardship. None of these countries has an updated cadaster of land holdings, and as a result statistics and ensuing policies are based on approximations. Overall, there are recurrent institutional and regulatory weaknesses in land policies. Ecuador, Bolivia and Peru have centralized authorities that oversee land issues attached to the Ministries of Agriculture. In Bolivia the Vice-Ministry of Land, located within the Ministry of Rural Development, Agriculture and the Environment, is responsible for land policy, norms, and strategy whereas the National Institute for Agrarian Reform (INRA) is the key implementer. In Ecuador the Undersecretary of Land Issues replaced the Institute for Agrarian Development (INDA) and is currently responsible for devising and carrying out land policies. In Ecuador, Bolivia and Peru, these national offices are sometimes not completely coordinated with municipal level property registries that also have responsibilities over land titling.

In Peru, a number of mining and logging activities have encroached on the lands of native communities that have not secured formal land titles, increasing social conflicts. This situation is occurring in the Condor-Kutuku-Palanda Corridor in southern Ecuador. In Colombia, successive government interventions aimed at fostering land reform have been largely ineffective due lack of financial and human-resource capacity. In the early 2000s, the Government of Colombia de-emphasized land reform and shifted focus to rural development through agribusiness. Land tenure reform is a key theme in the current peace negotiations.

Although governments have institutional offices to resolve land disputes, these are often beyond the reach for the rural poor. The cost of formalizing land titles is a critical barrier in Bolivia, Ecuador and Peru. Registering property takes 16 working days in Ecuador, 33 in Peru and 92 in Bolivia, and costs average approximately 2.2 percent of the property cost in Ecuador, 3.3 percent in Peru and 5 percent in Bolivia (USAID 2010a, USAID 2010b, USAID 2010c). However, Peru's Special Land Titling and Catastral Project (PETT) initiated 22 years ago can be singled out as one of the largest programs to formalize rural land rights in the region. PETT has had significant success, providing formal titles for over 1.9 million plots of rural land as of 2010.

6.4 Policies and Regulations for Conservation Financing

Hotspot countries have established a variety of mechanisms and instruments for the sustainable finance of protected areas, conservation incentives and systems of payments for ecosystem services, in particular for watersheds, making this region a pioneer in this area. A review of these mechanisms is provided in Chapter 10. In addition to those financial mechanisms, there are a number of regulatory and institutional arrangements present in the hotspot countries aimed at conservation that are worth highlighting here.

A recent (2012) regulatory development in Colombia led by the National Environmental Licensing Authority (ANLA - *Autoridad Nacional de Licenciamiento Ambiental*) is the Biodiversity Compensation Manual (*Manual para la Asignación de Compensaciones por pérdida de Biodiversidad*). This instrument provides guides for environmental offsets of economic activities, especially in the mining and petroleum sectors that cause impacts that cannot be avoided or mitigated. Typical recommended offset factors are 2-10 times the area affected. This compensation policy for no net loss of biodiversity is by far the most advanced in the region and an interesting model to extend to other countries. In addition, Colombia´s current environmental policy promotes the creation of municipal conservation areas for watershed protection, such as through land acquisition and co-management agreements (Ministerio del Ambiente y Desarrollo Sostenible, República de Colombia 2011).

Ecuador's Socio Bosque program, a conditional cash-transfer initiative that compensates forest owners (individual and collective land owners) for conservation, has generated important results with over 1.2 million hectares under 20-year contracts. In priority KBAs such as Cotacachi-Cayapas, Cayambe-Coca, Podocarpus and Cordillera del Cóndor there are a number of Socio Bosque agreements with indigenous groups that provide an important foundation for conservation activities. Currently, the Socio Bosque scheme is also available for other ecosystems such as the Andean páramo, and is aiding in forest policy by incorporating forest management and restoration incentives through similar arrangements. CEPF helped pilot Socio Bosque aiding communities to enter and maintain their lands under the program in the Chocó region. Peru has adopted a similar program (under its *Programa de Conservación de Bosques*) which is initially focused on Amazon indigenous lands. The Peruvian program has established a number of agreements in and near the Cordillera del Condor, part of a binational Condor-Kutuku-Palanda Corridor.

In Venezuela and Chile there are governmental funds (*e.g., Fondo Nacional de Ciencia y Tecnología* in Venezuela and *Fondo de Protección Ambiental Concursable* in Chile) that offer research grants to universities, research centers and civil society organizations for biodiversity conservation. In Venezuela, financing is provided by a tax of 0.5-2 percent on the net income of private and public enterprises.

In Peru, the current drafting of the Environmental Services and Corporate Social Responsibility Law has catalyzed discussion on conservation incentives. There are favorable conditions for the law's enactment during the current governmental, opening opportunities for increasing private and community stakeholders' involvement in conservation initiatives (*e.g.,* private reserves).

6.5 Legislation and Policies on Protected Areas Management

All of the Tropical Andes countries have made important advances in establishing and consolidating national protected areas systems. Although each country has established different categories, norms and nomenclature for its protected areas, the majority of these are compatible with protected areas categories established by the IUCN. The IUCN categories including areas under strict protection (*e.g.*, national parks, monuments or reserves) and those managed for multiple-use (IUCN 2014). These protected area systems also include UNESCO World Heritage Sites, Biosphere Reserves, and Wetlands of International Importance (Ramsar Convention), many of which overlap with national protected areas. Subnational protected areas created by municipal, provincial or state governments are also expanding, although many are under less strict protection than national protected areas and have limited funding (Elberst 2011). A summary of protected areas coverage for the countries within the hotspot is provided in Tables 4.12a and 4.12b.

Each country has established legal underpinnings and management mechanisms for national protected areas. All countries have designated a central agency that has the technical and regulatory authority over protected areas. While countries such as Venezuela and Chile have regional agencies or offices in charge of protected areas, the other countries in the hotspot have a central agency that coordinates with regional, provincial or municipal jurisdictions the management of subnational protected areas.

Some countries are developing systems for integrating management across jurisdictional levels. In Argentina the Federal System of Protected Areas (*Sistema Federal de Areas Protegidas* – SIFAP) coordinates management of protected areas across federal and provincial jurisdictions, with the aim of strengthening provincial protected areas systems (Elbers 2011). The majority (over 80 percent) of land in Argentina is in private hands, limiting the ability to expand areas under national protection. Acknowledging this limit to government land protection, both national and provincial authorities engage in private conservation agreements.

Colombia’s system of protected areas also includes both national and regional areas, with regional subsystems under the authority of the Corporaciones Autónomas Regionales (PNGIBSE 2011). Peru and Ecuador are similar, with regional or local governments responsible for some subnational areas. For example, the Los Bancos-Milpe KBA and Northwestern Pichincha Corridor in Ecuador have a number of protected areas under Municipal (Quito) and Provincial (Pichincha) administration. Similarly, the Ocobamba-Cordillera de Vilcanota KBA in Peru is a conservation priority for the Cuzco departmental government. The Bolivian Protected Areas System includes ecological corridors as a protection category. The Corridor supported by previous CEPF investment is an international reference for successful corridor conservation. Several KBAs such as Madidi, Pilón Lajas, Apolobamba, Amboró and Carrasco are part of the Amboró-Madidi Corridor. Previous CEPF work in partnership with Wildlife Conservation Society, FUNDESNAP, municipalities and local communities (*e.g.*, the T’simane Mosetene Regional Council) has increased the communities’ capacity for territorial management and protection and for sustainable livelihoods through cocoa cultivation.

The region's protected areas systems have also increasingly incorporated mechanisms for participation, in both governance and management, by communities and civil society. Peru has a variety of management instruments, including conservation concessions which can cede public lands for long-term conservation management by private enterprises, NGOs or communities. Several countries include mechanisms for joint management with indigenous communities where protected areas overlap ancestral lands. In Colombia, the Civil Society Reserves can be formally recognized within the national system for their role in conservation and landscape connectivity (IUCN 2011). The Serraniagua Corporation, a CEPF partner, has successfully used a variety of reserve mechanisms to bring about conservation connectivity. Serraniagua's work connects the conservation corridors of the Tatamá National Park and the Serrania de los Paraguas through a series of sixty community-managed and seven regionally-managed nature reserves.

All national protected areas systems in the hotspot are grounded in national constitutions or laws. Nevertheless, protected areas across the region are still legally vulnerable to development pressures from both private and public projects, including road construction and mining, oil and timber concessions. Although significant progress has been made, many protected areas still have unresolved tenure overlaps and inholdings as well as incomplete boundary demarcation. For example, in the Cotacachi-Cayapas KBA in Ecuador, neighboring indigenous and Afro-descendant communities have been marking and mapping boundaries shared with the protected area. This was supported by CEPF. Table 6.6 provides further details on the institutions in charge of protected areas and their governance.

Table 6.6. Institutions and Governance of Protected Areas

Country	Description of National System	Governmental Institutions Involved	Observations on Protected Areas Governance
Argentina	The Federal System of Protected Areas (SIFAP) oversees all national areas and coordinates conservation policy with the subnational levels.	The National Parks Administration (APN) is responsible for federal (national) coordination with provincial and municipal governments. Some protected areas in the federal system are managed by private stakeholders and universities.	There are five indigenous and local communities with co-management modalities with SIFAP.
Bolivia	The National Protected Areas System (SNAP) includes those at national and departmental levels.	The Bolivian National Protected Areas Service (SERNAP) oversees national areas and those in joint administration with indigenous groups. Municipal and local governments also manage protected areas.	Most areas have management committees that serve as venues for multi-stakeholder decision-making. Where indigenous territories overlap with protected areas there is a shared management regime, "*Gestión Territorial con Responsabilidad Compartida* (GTRC)".
Chile	The National Protected Areas System (SNASPE) includes terrestrial, aquatic, public and private areas.	The Biodiversity and Protected Areas Service is responsible for integral management, often through co-management schemes with private stakeholders.	Current changes in regulatory framework are expected to strengthen the Private Protected Area System (APP) that is part of the SNASPE.

Country	Description of National System	Governmental Institutions Involved	Observations on Protected Areas Governance
Colombia	The SINAP - National Protected Areas System include all public, private and community areas.	*Parques Nacionales de Colombia*, within the Ministry of Environment and Sustainable Development, leads the System in coordination with the Autonomous Regional Corporations (CARs), decentralized public offices present in each region. The CARs have achieved an important level of institutional strength as they are able to collect funding from private as well as public sources.	Protection regimes include National Parks, Civil Society Reserves, and Protected Forest Reserves. Co-management schemes have allowed for improved management and financial sustainability of areas. RESNATUR – the civil society natural reserves network – represents most of these reserves in the country.
Ecuador	The National Protected Areas System (SNAP) includes four management subsystems: state (PANE), subnational-decentralized, community and private reserves.	The Natural Heritage Undersecretary within the Ministry of Environment leads the SNAP. The environmental units within the municipalities often coordinate subnational protected areas systems present in larger provinces.	There are a number of indigenous groups that have co-management agreements where protected areas overlap their territories. The *Red de Bosques Privados* supports reserves owned by private stakeholders (individuals, NGOs, community organizations). There are also some conservation initiatives led by subnational governments that have established corridors and protected areas.
Peru	SINANPE, the National Protected Areas System, comprises national, regional and private conservation areas.	The National Protected Areas System Service (SERNANP) within the Ministry of Environment leads the SINANPE.	The majority of protected areas have multi-stakeholder management committees. A number of private conservation areas are managed by indigenous and local communities and NGOs.
Venezuela	The National Park and Natural Monuments System groups all protected areas and sites under special conservation regimes (ABRAE- *Areas Bajo Regimen de Administración Especial*).	The National Parks Institute (INPARQUES) is in charge of the System. INPARQUES is a part of the Vice Ministry of the Environment and operates through subnational offices.	INPARQUES formulates conservation and protected areas policy, which is carried out by the regional offices.

Several hotspot countries have policies to generate income from tourism in protected areas to help support the management of those areas. Other financial mechanisms such as payment for ecosystem services or REDD initiatives are also under development (see Chapters 9 and 10). In Bolivia, 50 percent of after-tax revenues from park entrance fees support management of the area (FUNDESNAP 2014). In Peru, resources generated in protected area such as entrance fees, tourism services, Payment for Ecosystem Services, and REDD projects are invested back into the Peruvian Protected Areas System. The Machu Picchu Historical Site is the largest collector of these funds. As of 2011, of the 77 protected areas managed by the SERNANP, approximately 18 have plans and regulations for services and tourism activities (SERNANP 2011). In Venezuela, 5 percent of the budget for protected areas comes from resources generated from services and fees (ARA 2011). In Argentina and Chile, income generated by protected areas contributes 30 percent and 27 percent of the budget for protected areas, respectively (RedLAC 2011).

Although financing schemes for ecosystem services in protected areas are still incipient, there are interesting Payment for Ecosystem Services schemes emerging in protected areas in Peru, Colombia and Ecuador. In Colombia the National Environmental Fund, FONAM, manages financial resources from the payment of ecosystem services in areas of the National System of National Parks, such as the Chingaza National Park, and from payments of the Urrá hydroelectric plant for the management of the Paramillo National Park (FONAM 2013). Colombia is developing regulations (Section 111 of Act 99 of 1993) for the purchase and maintenance of land and financing schemes for Payment for Ecosystem Services in areas of strategic importance for water resource conservation (V Informe en Biodiversidad 2014). Colombia and Argentina are also including incentives for Payment for Ecosystem Services within protected areas as part of their national REDD+ strategies (MADS 2013, Orduña 2012). In Peru, PROFONANPE is promoting payment schemes for ecosystem services in watersheds such as the KBA within the Nor Yauyos Cochas Landscape Reserve, as part of a $5 million project supported by the International Fund for Agricultural Development (IFAD). PROFONANPE has another Payment for Ecosystem Services project in Salinas y Aguada Blanca National Reserve in Arequipa (RedLAC 2010). Payment for Ecosystem Services schemes have so far not been implemented in protected areas in either Venezuela or Bolivia.

6.6 Infrastructure and Multi-Sector Development Strategies

National Development Strategies or Plans

All hotspot countries have national development plans that orient their policies, including an emphasis on priority sectors for development. In all of these plans, poverty reduction and investment for economic growth are highlighted. While the environment and conservation are referenced in national development plans and strategies, truly integrating them with other development priorities remains a challenge. In Colombia, Ecuador, Peru and Bolivia, ecosystem services and conservation are under pressure from other sectors highlighted as priorities: expanding energy and transportation infrastructure, increasing capacity of the hydrocarbon and mining sectors and augmenting agricultural output, including biofuels. In Chile, the hotspot overlaps a major region for mining, a bulwark of the national economy.

Infrastructure Plans and Policies

Foreign investment in the hotspot plays an important role in the expansion of energy and transportation infrastructure, which are underlying drivers of deforestation (further discussed in Chapter 8). Private foreign direct investment has been particularly strong in Colombia, Peru and Chile in recent years (World Bank 2014). Foreign Direct Investment (FDI) has grown in the past five years in Latin America and the Caribbean. In 2012 Foreign Direct Investment flowing into Latin America and the Caribbean hit a record high of US$ 174.5 billion. This is 5.7 percent above the level posted in 2011 and confirms a consistent upwards trend that began in 2010. The largest increases in Foreign Direct Investment were in Peru (49 percent) and Chile (32 percent). Inward Foreign Direct Investment (which occurs when one company purchases another business or establishes new operations for an existing business in a country different than the investing company's origin) also rose significantly in Colombia (up 18 percent) and Argentina (a 27 percent increase) in 2012. In the hotspot countries the pattern has been one of increasing concentration of Foreign Direct Investment in natural resource-based sectors (in particular mining), which are the prime Foreign Direct Investment destination (51 percent in 2012), while manufacturing and services accounted for 12 percent and 37 percent, respectively (CEPAL 2013).

Public sources of finance have been important across the region and predominant in Venezuela, Ecuador and Bolivia. With rising prices for commodities, these countries have used revenues to invest in social programs and public works, including road infrastructure and hydropower (Perrotti 2011). From a regional integration perspective, infrastructure connectivity (roads, border crossings, telecommunications, electric energy) within and between countries is still significantly deficient. Projections recommend that at least 5 percent of GDP in the Andean countries should be earmarked for infrastructure development to cover investment needs (IDB 2012). According to the Inter-American Development Bank (IDB 2012), hotspot countries invest an estimated of $125 billion per year from private and public sources in infrastructure development (according to 2010 figures), while investment needs are estimated at around $250 billion per year. Investment from multilateral donors operating in the region (Inter-American Development Bank, World Bank and Latin American Development Bank) represented 12 percent of the total infrastructure expenditures in 2010.

Another major player in the region today is China. By 2013, direct investment and lending by China in five Andean countries was greater than any single multilateral donor, with $99.5 billion going to infrastructure, mining, and hydrocarbon investments from 2005-2013 (see Tables 6.7 and 6.8). Chinese banks financed a different set of countries than the multilateral donors, mostly Argentina, Ecuador and Venezuela, which were not able to borrow as easily in capital markets (Boston University, 2014). While several of these investments were located outside of the hotspot, others were located within its boundaries. Expansion of investments of this magnitude can only result in increased pressures on all ecosystems.

The Government of China has adopted measures to ensure that environmental and social safeguards are put in place for its international investments, by issuing in 2012 the *Green Credit Directive* (Chinese Banking Regulatory Commission 2012) and in 2013 *Guidelines for Environmental Protection on Foreign Investments and Cooperation*. These documents provide explicit language on adhering to international standards of environmental and social safeguards and aim to ensure that best practices and due diligence is followed on all international projects. Challenges remain in putting these policies into practice, as the adoption of social and environmental safeguards for Chinese investments and loans is regarded as weak within the environmental community. At the same time, opportunities exist to engage civil society organizations to work within these policy frameworks to influence compliance with the safeguards. (Garzon 2014)

Table 6.7. Chinese Investment by Sector in Andean Countries, 2005 – 2013 ($100 millions)

Country	Mining	Tech-nology	Transport-ation	Real Estate	Agriculture	Hydro-carbons	Total
Bolivia		300	190		170		660
Colombia						1,400	1,400
Ecuador	2,700					6,600	9,300
Peru	7,200				820	2,600	10,620
Venezuela	410		8,300	940	430	6,000	16,080
Total	**10,310**	**300**	**8,490**	**940**	**1,420**	**16,600**	**38,060**

Source: Heritage Foundation Tracker. (Garzon, 2014)

Table 6.8. Chinese Lending by Sector in Andean Countries, 2005 – 2013 ($100 millions)

Country	Metals	Infra-structure	Hydro-power	Hydro-carbon	Other	Total
Bolivia		300		60	250	610
Colombia					75	75
Ecuador		2,080	4,258		1,600	7,938
Peru	2,000	100			150	2,250
Venezuela	1,700			39,390	9,500	50,590
Total	3,700	2,480	4,258	39,450	11,575	61,463

Source: China-Latin America Data Base, Inter-America Dialogue. (Garzon, 2014)

IIRSA, the South American Regional Integration Initiative, continues to be a major driver of large-scale infrastructure development in the region. IIRSA is a blueprint to meet regional infrastructure development needs agreed to by governments with the support from the Inter-American Development Bank (IDB), Latin American Development Bank (CAF) and the Financial Fund for the Development of the River Plate Basin (FONPLATA). It aims to bring about transportation (roads, ports, airports), telecommunications and energy (hydropower, electricity) integration. The Brazilian Development Bank (BNDES) was a key financial partner of IIRSA until 2009. Since 2009 IIRSA has been incorporated into UNASUR, the Union of South American Nations. IIRSA operates through UNASUR's COSIPLAN, the Council on Infrastructure and Planning (*Consejo de Infraestructura y Planificación)*. Until 2006, BNDES was the largest financial partner of IIRSA, with an approximate investment of $350 million (Gudynas 2008).

According to IIRSA's 2012-2022 Strategic Action Plan, there are 31 priority projects, which include 131 sub-projects (IIRSA undated). By 2013, 89.5 percent of the projects from an estimated investment of US$ 16.7 billion correspond to transportation (road improvement and new road connectivity). This investment includes projects in the initial profiling, pre-execution (pre-feasibility and feasibility analysis) and execution phases. IIRSA groups its project portfolio by “hubs,” or corridors that overlap but have different geographic foci. Four hubs overlap the hotspot extensively (Table 6.9).

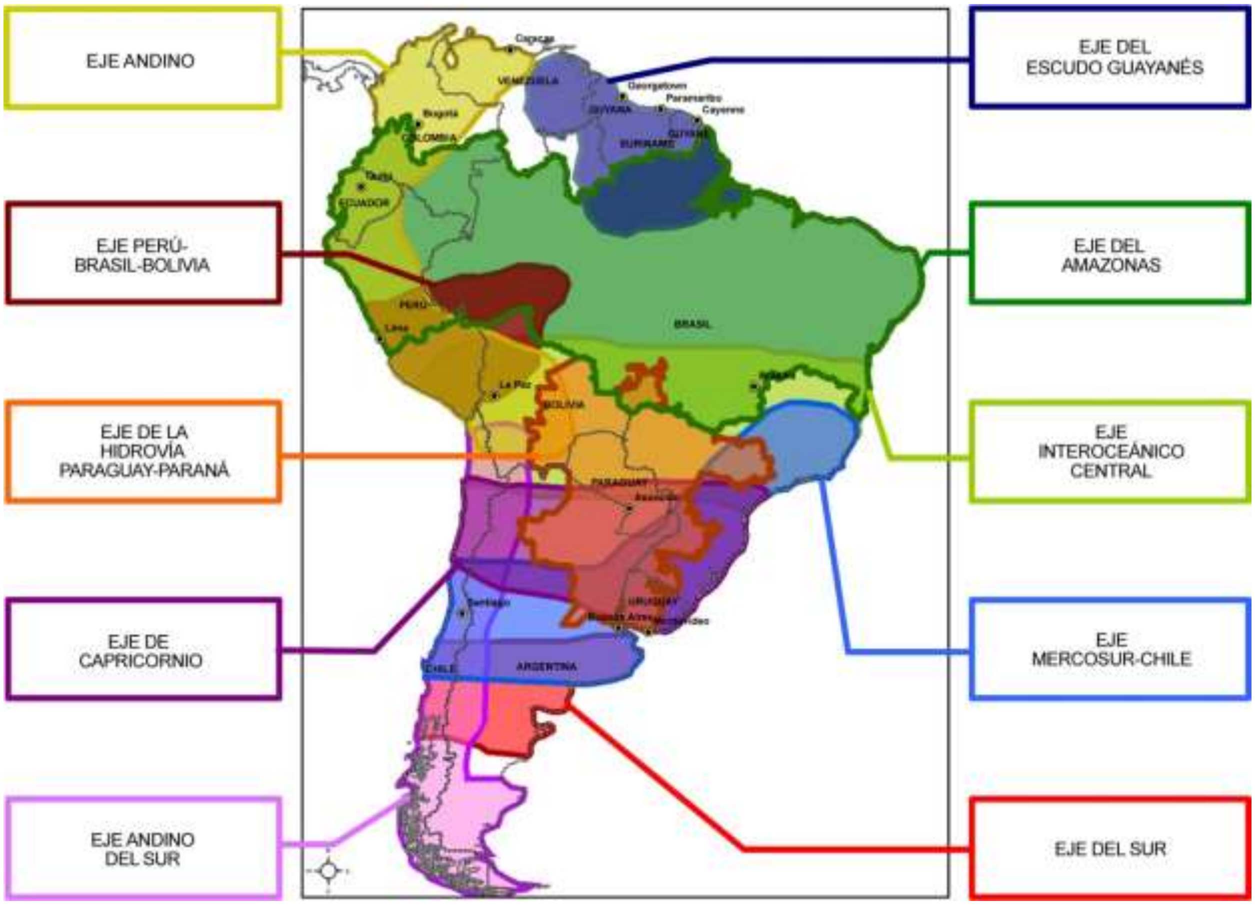
Table 6.9. IIRSA 2013 Portfolios in Investment Hubs that Impact the Tropical Andes Hotspot

Hub	Number of Projects*	Estimated Investment (Billions of US$)
Andean	12	3.694
Amazonian	27	3.475
Central Interoceanic	7	0.460
Peru-Brazil-Bolivia	1	0.085
Capricorn	18	4.233

Source: UNASUR- COSIPLAN 2013 *Individual projects contain a number of associated subprojects.

Figure 6.1 illustrates the geographical reach of IIRSA´s strategic hubs (*ejes*) in South America, showing how the hubs that impact the Tropical Andes Hotspot (Amazonian, Andean, Central Interoceanic and Peru-Brazil-Bolivia) overlap with other hubs. Two additional hubs, Southern Andes and Capricorn, extend to the southern tip of the hotspot in Bolivia, Chile and Argentina. A sample of specific road construction, rehabilitation and improvement projects that will affect corridors and KBAs in the Tropical Andes is presented in Table 6.10. IIRSA’s portfolio also includes the construction and improvements of ports (marine and river), airports and border infrastructure which potentially may impact the hotspot directly or indirectly.

Figure 6.1. IIRSA Investment Hubs in South America



Source: Red Geoespacial de América del Sur (2011).

Table 6.10. Selected IIRSA Road Projects and Potentially Impacted KBAs and Corridors

Investment Hub (*Eje*)	Project	Potentially Impacted KBAs/Corridors
Amazonas	Road corridor Tumaco-Pasto-Mocoa-Puerto Asis (Colombia)	Valle de Sibundoy & Laguna de la Cocha
	Road Paita-Tarapoto-Yurimaguas (Peru)	Northeastern Peru Corridor (Alto Mayo)
Andean	Road improvement: Puerto Bolivar-Pasaje-Santa Isabel-Girón-Cuenca-Pauta-Amaluza-Méndez-Puerto Morona (Ecuador)	Cotopaxi- Amaluza Corridor
	Road improvement: Guayaquil-El Triunfo-La Troncal-Zhud-El Tambo-Cañar-Azogues-Paute-Amaluza-Méndez (Ecuador)	
	Road corridor Santa Marta-Paraguachón-Maracaibo-Barquisimeto-Acarigua (Colombia -Venezuela)	Venezuelan Andes Corridor KBAs
	Border crossing improvement between Santander	

	Department (Colombia) and Tachira Department (Venezuela)	
	Road corridor Bogotá-Cúcuta (Colombia)	Northeastern Cordillera Corridor
	Road corridor Bogotá-Buenaventura (Colombia)	Paraguas-Munchique Corridor KBAs
	Road Zamora-Palanda (Ecuador)	
	Road pavement Vilcabamba-Puente de Integración-Jaén (Ecuador-Peru)	
	Road improvement: Puerto Bolivar-Santa Rosa-Balsas-Chaguarpamba-Loja-Zamora-Yantzatza-El Pangui-Gualaquiza-Leonidas Plaz-Méndez (Ecuador)	Cóndor-Kutuku-Palanda Corridor
	IIRSA Centro Tramo 2: Ricardo Palma- La Oroya-Desvío Cerro de Pasco-La Oroya-Huancayo (Peru)	
	IIRSA Centro Tramo 3: Road detour improvement Cerro de Pasco-Tingo María (Peru)	KBAs in Carpish Yanachaga Corridor
	Road improvement: Juliaca-Desaguadero (Peru - Bolivia)	Lago Titicaca KBAs
	Road pavement: Potosí-Tarija (Bolivia)	Reserva Nacional de Flora y Fauna Tariquía KBA
Tropic of Capricorn	Border crossing improvement Access to Paso de Jama (connection between Highways 52 (Argentina) and 9 (Chile)	Trinational Puna Corridor
Interoceánico Central	Road construction Ollagüe-Collahuasi (Chile)	
	Road pavement Potosí-Tupiza-Villazón (Bolivia)	
	Road construction Cañada Oruro-Villamontes-Tarija-Estación Abaroa (Bolivia)	
	Border crossing improvement Ollagüe-Estación Abaroa (Chile-Bolivia)	Trinational Puna Corridor
	Road rehabilitation El Sillar (Bolivia)	Lago Poopo, Caine y Mizque Watersheds KBAs
Peru-Bolivia-Brazil	Road pavement Iñapari-Puerto Maldonado-Inambari, Inambari-Juliaca/Inambari-Cuzco (Peru)	KBAs in the Cordillera de Vilcanota Corridor

Source: UNASUR-COSIPLAN 2013

Civil society organizations, especially in Peru and Bolivia, participated in advocacy and monitoring networks for a number of IIRSA projects prior to its incorporation under COSIPLAN. CEPF's previous investment supported multi-stakeholder discussion, several social and conservation impact studies around road construction, local monitoring and patrolling of at risk-protected areas in the Northern and Southern Interoceanic Highway (Bolivia and Peru). These activities proved critical for engaging local civil society and communities in efforts to mitigate environmental impacts of this infrastructure project. These efforts were combined with livelihood projects that took advantage of the improved road construction while also providing incentive for conservation.

COSIPLAN looks to be the key regional forum for discussion and development of these and other projects, and important for civil society organizations seeking to ensure that biodiversity conservation and safeguards are adequately taken into account. Currently, civil society organizations from Peru (Derechos, Ambiente y Recursos Naturales), Colombia (Asociación Ambiente y Sociedad), Bolivia (Centro de Estudios para el Desarrollo Laboral y Agrario), Ecuador (Centro de Derechos Económicos y Sociales) and Argentina (Fundación para el Desarrollo de Políticas Sustentables) have an informal network that is trying to generate mechanisms for transparency and participation within COSIPLAN.

Beyond IIRSA, there has been an upsurge in lending for infrastructure development projects from China (China Development Bank and other mechanisms) and Brazil (principally BNDES). While other multilateral institutions (World Bank, Inter-American Development Bank and the Andean Development Corporation) continue to play an important role in the region, these newer bilateral lenders have less developed environmental policies and safeguards (Friends of the Earth 2012, World Resources Institute 2012) than the multilaterals that have been historically active in the region. State-run Chinese companies are also active in developing mining concessions, hydropower and road construction in the region. China is the major investor in Ecuador hydropower and petroleum projects. In Peru, Brazil is supporting a controversial set of 15 large-scale hydropower projects under a bilateral agreement, with financing provided by BNDES (DAR 2011).

Agricultural Sector Plans and Policies

As mentioned in the previous chapter, agriculture and livestock activities are key parts of rural communities' livelihoods but also play a pivotal role in habitat loss. In rural areas of Argentina, Colombia, Ecuador, Peru and Bolivia, agriculture is still the main sector of labor employment, and the sector is receiving renewed impetus from national governments. In Peru, the signing of free trade agreements with the United States and Europe is expected to increase attention on the agricultural sector. In Colombia, as part of the process of entering into a free trade agreement with the United States, the government plans to support modernization and facilitate investment by agroindustry (Ministerio de Agricultura y Desarrollo Rural de Colombia 2012). Linking conservation efforts with agricultural policy in the countries is therefore a priority. The role of agriculture and livestock sectors as key drivers of habitat loss in the hotspot is described in Chapter 8.

Land distribution and land tenure insecurity challenge agricultural promotion policies particularly in Colombia, Ecuador, Bolivia and Peru. As mentioned earlier, unequal land distribution in Colombia, as well as escalating competition for resources, has fueled conflict between guerilla insurgencies and paramilitary groups, with rural communities caught in the middle. Over time, armed groups have gained territory by displacing small landholders from their land. In light of the free trade agreement with the United States, addressing these issues is critical. However, due to contradictory policies, agricultural land is frequently either under or overexploited. Nearly one-quarter of land used for grazing is prime agricultural land that could be better used for growing crops, while land that ideally would be conserved or left as forest is over utilized for crops or grazing resulting in erosion and destruction of forest and water resources (USAID 2010). Difficulties in generating a sustainable income from agriculture have driven many impoverished farmers in Bolivia to plant coca. Land conversion for coca plantation affects a number of KBAs identified in the Isiboro-Amboro Corridor.

In Ecuador and Peru, governments have initiated programs to foster agricultural production by small to medium size landowners. In Ecuador, Socio Siembra Program provides monetary transfers and technical assistance for poor, small landholders. In Peru, the AgroRural and AgroBanco programs within the Ministry of Agriculture and Irrigation (MINAGRI) provide technical and financial assistance for rural producers. Since 2010, the Venezuelan government has been promoting coffee production and processing as a strategic enterprise. In 2013, the government fixed coffee prices and banned the export of coffee to lower the country's reliance on imported coffee (FEDEAGRO 2013). Colombia provides credits to the agricultural sector through two specialized funds, FINAGRO and the National Fund for Livestock (*Fondo Nacional Ganadero*). During Colombia's agricultural sector protests in 2013, demands for greater transparency in how funds are allocated within these mechanisms were part of the demands, as they currently are not targeting at small landowners.

As mentioned in the previous chapter, the production of the traditional Andean crop quinoa has increased in Bolivia to the point that it is now an important export. This expanding market has increased the income of indigenous and rural farming communities in the Bolivian highlands. Future conservation investments should look into greater detail how to promote puna ecosystem management that can yield sustainable quinoa production.

Although government investment in agriculture can help reduce poverty, increase rural employment, enhance food security and increase export earnings, these projects also contribute to the expansion of the agricultural frontier, the major driver of deforestation across the hotspot. Agricultural policies in Colombia, Peru and Argentina are not only targeted to smallholders but to medium and large agribusinesses that have been responsible for substantial habitat destruction.

Significant public support for agriculture is provided in all countries, in the form of technical assistance, subsidies, credit and tax incentives, dwarfing the amount spent on conservation. There are still contradictions between conservation and agricultural support programs and policies (Estrada 1995, Grau and Mitchell 2008) as most of the support is geared to large-scale agribusiness and sustainable agricultural efforts (i.e. agroforestry) are woefully under supported. Nevertheless, there is also clearly scope to generate synergies and safeguards between agricultural investment and biodiversity given the level of investment in the sector, and the increasingly strong agricultural associations and organizations found in Colombia, Ecuador, Peru, Bolivia and Argentina (Lowery *et al*. 2014). As will be discussed in Chapter 7, there are also a number of productive associations (such as coffee and livestock in Colombia and cocoa and coffee in Ecuador, Peru and Bolivia) with opportunities for conservation partnerships.

Extractive Industries: Plans and Policy

Across the region, investment in energy, mining (metals such as gold, copper and non-metals such as coal and lithium) and hydrocarbons has grown, driven by a global boom in commodity prices. Oil and mineral extraction consequently plays a larger role now in the development agendas in hotspot countries. This push has increased conflict with indigenous and local communities where operations are underway or planned, and has placed pressure on the institutional and regulatory frameworks that support conservation. The expansion of mining activities in the hotspot has occurred at all scales of operation, ranging from informal and illegal (for example, in Madre de Dios in Peru and the Chocó region in Colombia and Ecuador) to large-scale commercial operations such as those in the Peruvian and Chilean altiplano.

Chile, Bolivia and Peru, countries with a long history of mining, have very detailed regulatory frameworks for mining that seek to establish high environmental standards. Argentina and Ecuador have enacted recent reforms to facilitate investment (both in mining and petroleum), including environmental and social requirements. However in these countries large-scale commercial mining is a relatively recent activity. Notwithstanding these legal requirements, there are still shortcomings in implementation and enforcement, made more complex by the fragile ecosystems found in the hotspot and the impacts on local communities. In Peru, for example, the national ombudsman (*Defensoría del Pueblo*) registered 216 social conflicts nationwide during 2013, of which just over half had to do with mining (Defensoría del Pueblo undated). Conflict often centers on competition exerted by mining on land and water resources that sustain highland subsistence farmers (OXFAM 2014). In July 2014, in a setback for conservation, the Peruvian Congress enacted a law aimed at increasing investment that stripped the Environmental Ministry of its authority to set quality standards (for air, soil and water resources) as well as its power to establish nature reserves exempt from mining and oil drilling. In the hotspot KBAs in Chile, large scale mining creates conflicts with the few remaining Aymara and Quechua communities in the altiplano over water resources. In Chapter 8, mining and its threats to conservation is discussed in greater detail.

Given the increase in mining revenues, policy frameworks in hotspot countries have been modified to distribute them among subnational governments. Argentina, Bolivia, Colombia, Ecuador, and Venezuela all have revenue-sharing systems that earmark a large portion of natural resource revenues for states, regions, and municipalities. Pressures to obtain more advantageous revenue-sharing arrangements by localities where natural resources are exploited are also frequently a component of social conflict (World Bank 2010).

Limited institutional capacity continues to be a constraint for effective environmental management of extractive industries. Nevertheless, there has been important progress in large-scale mining. In recent years, many large mining companies have come to realize that it is in their long-term interests to behave in environmentally (and socially) responsible ways. Many companies operating in Chile and Peru ascribe to international mining standards, such as the ten sustainable development principles of The International Council of Mining and Metals or the Extractive Industries Transparency Initiative, and can serve as examples for other hotspot countries. However, not all large-scale operations share this commitment and small-scale artisanal producers are often beyond the reach of policy and regulations. In Ecuador, the recent mining legislation created the National Mining Enterprise (*Empresa Nacional Minera*, ENAMI), which will provide technical assistance to small and artisanal mining groups so they can comply with environmental and social standards.

All countries require that environmental impact assessments for mining projects be completed through ministries or independent agencies (*e.g.*, ANLA in Colombia; the Environmental

Evaluation Service in Chile; the Environmental Evaluation and Fiscalization Agency, OEFA, in Peru), but staffing and technical capacity to effectively review these assessments is often limited, especially with regards to biodiversity impacts. In addition, recent legislation in Peru has weakened environmental regulation (Environmental Watch 2014).

Colombia is the only country in the region that has tools in place for compensation or offsetting of biodiversity impacts (Ministerio del Ambiente y Desarrollo Sostenible de Colombia 2012). The Colombia experience provides an important opportunity for establishing comparable measures in other hotspot countries facing significant and hard-to-mitigate impacts from extractive industries and infrastructure development.

Forestry Sector

As discussed in the previous chapter logging, both legal and illegal, has significant impacts on the forests of the hotspot, particularly in the Andean-Amazon countries, with significant economic and biodiversity consequences in the KBAs identified. Chapter 8 discusses deforestation and degradation in greater detail.

Except for Colombia, whose 2006 Forestry Law was repealed, all countries in the hotspot have explicit legislation that promotes sustainable forest resource use and management. Bolivia, Chile, Ecuador and Peru have specific norms and standards for logging activities in native forests. Argentina's Minimum Budget for the Protection of Native Forests Law (*Ley de Presupuestos Mínimos para la Protección de Bosques Nativos*), enacted in 2007, is considered a milestone for the sector, but it is still weakly enforced. Key financial and technical agreements for sustainable logging have yet to be established between the federal government and the provinces. Although logging in the hotspot portion of Argentina is still a localized activity, it was mentioned in the stakeholder workshop as a growing threat to the Tucuman-Yungas Corridor because of loggers shifting their attention from the neighboring Chaco ecosystem where almost no forest remains.

In Ecuador, logging activities are fundamentally private transactions between the forest landowner and the buyer (usually an intermediary). This configuration relates to the fact that most forestland is in the hands of private owners, the majority of which are indigenous and campesino/mestizo communities. The Ministry of Environment (National Forestry Directorate), through an independent third party (forest regents), oversees timber transactions issuing sustainable management plans and licenses to transport cut timber. The costs to legalize logging operations are a critical bottleneck for small- landowners that prefer to trade informally. A forestry incentive package that integrates reforestation and afforestation with sustainable forest management (such as *Socio Manejo*, which is designed to work analogously to the conservation compensation *Socio Bosque* program) has been recently established. All KBAs identified in Ecuador are affected by informal and illegal logging. With the construction and improvement of roads that connect Andean population centers with Amazonian slopes, forest degradation due to unsustainable logging practices will be critical to monitor in the southern Condor-Kutuku-Palanda Corridor.

Although most timber revenues in Peru are generated outside of the hotspot boundaries, illegal and informal logging is a key pressure in several KBAs (*e.g.,* Alto Mayo, Amboró and Carrasco). Regulations permit a variety of forms of access to timber and non-timber forest products, including permits from native communities, extraction from local forests, afforestation/reforestation concessions, conservation concessions, and ecotourism concessions. Legislation allows communities to use timber resources on community lands on the condition that they submit a forest management plan to the government and obtain approval of the plan prior to using timber resources. The National Sustainable Forestry Plan 2002-2021 in Peru serves as the main policy for this sector.

With the ratification of the free trade agreement with the United States, Peru committed to improved forest governance. A step in that direction is the establishment of the *Organismo de Supervisión de los Recursos Forestales y Fauna Silvestre* (OSINFOR), a regulatory office that supervises forest resource and wildlife management. However, OSINFOR still faces institutional difficulties in enforcement. With greater responsibilities over forests, regional governments have started to address sustainable forest issues. The case of San Martin (that has jurisdiction over the Colán-Alto Mayo KBA) is an important experience from which to derive positive lessons. There, a REDD+ mechanism empowers local communities to protect intact forests and restore degraded land. Another opportunity for engagement is the FONDEBOSQUE, a forest fund within the Ministry of the Environment that aims to support sustainable forest management operations.

In Bolivia, the Vice-Ministry of Biodiversity, Environment, Climate Change and Forest Development and Management, together with the Authority for Forests and Land (ABT), share jurisdiction and responsibility over forestlands. Timber harvesting is regulated and requires management plans for areas over 200 hectares. The law (1996 Forest Act) grants local groups priority over timber industry groups to forestland. Forestland can be vested in, or concessions can be allotted to (1) private individuals, entities and companies; (2) communal groups (such as indigenous groups, organized migrant colonists); and (3) the government. Local governments can grant Local Social Association (*Agrupación Social del Lugar*, or ASL) concessions in municipal forest areas to groups of 20 or more rural people who have proved that they previously had been using the forest resources. In Bolivia, FONABOSQUE serves as a funding facility to support sustainable forest management operations. Illegal timber extraction surrounding protected areas such as Carrasco and Madidi National Parks, both of which are KBAs, is an important threat. In the case of Madidi, the approved project to improve the airport and pavement of the road will introduce new pressure on this area.

The surge in interest and funding for REDD+ (combatting climate change based on Reducing Emissions for Deforestation and forest Degradation) in the last five years has spurred reforms and increased capacity in forest monitoring and governance particularly in Ecuador and Peru (see Chapter 9). Engaging with REDD+ programs in these countries can help leverage efforts in biodiversity conservation.

Tourism

As mentioned in Chapter 5, tourism is an important source of revenue in the hotspot countries. Each has institutional and regulatory frameworks for the promotion of sustainable tourism, but they fall short of being comprehensive. Support for ecotourism and sustainable tourism initiatives are still fragmented from mainstream tourism, socio-economic and biodiversity strategies across all countries. Argentina has a 2016 Federal Strategy for Sustainable Tourism, which aims at promoting investment in the northwestern provinces where the hotspot is located.

Key policy priorities are ecotourism centered in the Yungas Biosphere Reserve and community-based initiatives coordinated by the Federal Community Tourism Network (RFTC). RFTC works closely with ATUCOQUE, a regional network of community tourism operations that is active in the hotspot (see Chapter 7). The Andean countries have Ministries of Tourism with established policies to increase tourism in emblematic natural areas, parks and cultural-historical sites such as Lake Titicaca in Bolivia, Cuzco and Machu Picchu in Peru and Galapagos in Ecuador. Regional efforts to promote tourism in the Andean Community are integrated in the *Agenda para el Desarrollo del Turismo en la Comunidad Andina* 2011-2015.

Colombia's central coffee-growing region (*Eje Cafetero*) is an important and well-promoted destination for both national and international tourism. This area includes KBAs such as Parque Nacional Los Nevados, Tatama y Paraguas as attractions. In Ecuador, in the Sumaco Biosphere Reserve located in the Cayambe-Coca KBA, local governments have been active in promoting tourism linkages with sustainable production of cocoa. Similarly CEPF's investment supported the consolidation of sustainable tourism initiatives around the Cotacachi Cayapas Ecological Reserve in Ecuador, especially in its Andean portion. In Peru, the government of Cuzco is leading initiatives to strengthen community-based tourism through inclusive strategies targeting impoverished groups that have yet to benefit from the sector's dynamism. In Bolivia, previous CEPF investment in Madidi (San Miguel del Bala) has increased the capacity of local communities to conduct tourism activities. These activities in Madidi, in combination with investments in infrastructure expected from the World Bank (2014), will favor increasing options for sustainable income generation that can benefit conservation.

Water Resources

The regulatory framework for water resources has been strengthened in recent years in hotspot countries, with the creation of more powerful national institutions in Bolivia (*Ministerio del Agua*), Peru (*Agencia Nacional del Agua*) and Ecuador (*Secretaría Nacional del Agua*). However, water resources are still marked by inequity in access and conflicts between overlapping authorities (sanitation, agriculture and irrigation, urban development, environment, etc.).

In Ecuador, Peru, Bolivia and Chile, new national agencies have the authority and mandate to establish detailed regulations for planning, management and use of water resources. Unfortunately, these entities still have limited capacities and face difficulties in clearly establishing their jurisdiction vis-à-vis other government agencies, especially Ministries of the Environment. Water has traditionally been viewed from a sectoral perspective, with agriculture prominent, but there is clearly a need for better integrated management with a stronger environmental focus. This is particularly true in the Tropical Andes where surface water supplies are dependent on healthy natural ecosystems.

The region has seen growing interest in catchment and ecosystem conservation to ensure the stability of water sources, but there is still a marked need to develop effective mechanisms and policies. Participatory watershed management plans are being promoted as an important instrument, particularly in Colombia, Peru and Chile, with a vision of integrating these plans into broader territorial planning processes in order to manage water resources more efficiently and reduce conflicts. Colombia has perhaps the longest history of integrating environmental and hydrological considerations for water management, with its regional autonomous corporations using watersheds as their primary basis for environmental planning.

Hydropower development, an important economic activity in the Andes with significant conservation impacts (see Chapter 8), is subject to environmental impact assessment and licensing requirements. Legislation in Chile, Colombia, Peru and Ecuador contemplates the concept of minimum or ecological water flows to safeguard aquatic ecosystems. Colombian regulations provide guidance for offsetting biodiversity impacts, as described previously. These countries are also beginning to introduce requirements for environmental restoration and compensation from development activities, for example to compensate impacts of mining activities on watersheds in the Chilean case. Payments for environmental service schemes for water conservation are discussed in greater detail in Chapter 10.

Intersectoral coordination

A recurring theme, highlighted in the stakeholder workshops and analyses conducted in developing this profile, is the relative weakness of environmental and biodiversity conservation considerations as compared with other sectors and public policies, especially those associated with national economic development priorities. This situation undermines the effectiveness of environmental policies, in some cases dramatically, where development activities are implemented in protected areas, critical ecosystems and indigenous territories in spite of explicit restrictions in laws and regulations. The greatest challenge for effective environmental policy is changing this balance so that conservation and environmental quality are considered of sufficient political importance that they be systematically integrated in development decisions at all levels of governance. An informed and engaged civil society is essential to making this possible.

6.7 Conclusions

Several current trends create important opportunities (and needs) in the hotspot for improved land-use planning and governance policy, including the increasing role of subnational governments (*e.g.*, departments, provinces, states, municipalities) in zoning, implementation and enforcement regarding land use, as well as the growing, but still frequently weak, capacities of national governments in territorial planning, administration of protected areas systems, and land titling. Frequent social conflict over natural resource exploitation and infrastructure projects also underlines the need and opportunity for building stronger consensus and shared visions for conservation and development priorities. Colombia merits particular mention, given the important changes possible in the coming years. If the peace process continues, the countryside will likely see a significant resurgence of the agricultural frontier in areas abandoned by displaced families during the years of conflict. Government-supported resettlement and land distribution will play an important role in shaping this process, and can either augment pressures on biodiversity or orient rural development towards a path that values and reinforces resilient natural ecosystems.

Regulation ultimately is the most powerful tool for mainstreaming biodiversity considerations into private sector practice, creating a level playing field and minimum pre-competitive requirements applicable to all actors. Instruments such as biodiversity compensation or offsets, development of no-go areas, requirements for protection of high conservation values, and stronger biodiversity criteria and procedures in licensing processes can play important roles in creating incentives and disincentives for private sector development decisions. Given the strong economic interests involved, regulation is likely to be most effective when developed as part of a multi-stakeholder process including business, civil society and governmental perspectives.

Biodiversity is still often inadequately considered in planning, design and approval of infrastructure projects, including roads, hydropower and extractive industry. While the direct biodiversity footprint of even large-scale projects may be relatively limited, the indirect impacts can dramatically influence conservation through improvements in access, increased migration and settlement, and stimulation of local and regional markets and economic activity. Environmental ministries and other government agencies are frequently constrained by limited capacities, and in some cases authority, to evaluate and influence decisions that determine the biodiversity impact of these very significant development projects. A range of options, including adjustments in design, routing and siting, evaluation of alternatives and obligations to mitigate and compensate can make dramatic differences in the biodiversity impacts of development infrastructure investments. Decisions concerning these projects typically involve an array of public and private institutions, and may span multiple scales from the local and regional to the national and international, noting in particular at the local level the growing role of decentralized subnational governments and, at the international level, the importance of regional infrastructure programs (*e.g.,* IIRSA). CEPF's previous investments in multi-stakeholder involvement in monitoring the impacts of infrastructure development offer lessons for future intervention.

Public investments and programs play an important role in shaping land-use decisions that affect biodiversity conservation, not just for infrastructure development but also through rural sector policies outside the usual scope of environmental ministries. For example, programs for land reform and titling, agricultural credit, subsidies and technical assistance, as well as other incentive programs, are typically far better funded than most conservation investments. To the extent that these programs do not adequately consider biodiversity impacts they contribute to augmenting pressures on the agricultural frontier. But they also represent important potential opportunities to leverage funding and programs in ways that create synergies between rural development and biodiversity conservation objectives. Examples include facilitating access (or lowering costs) of public agricultural credit for farmers in priority conservation areas adopting biodiversity-compatible practices (*e.g.,* the FEDEGAN "Mainstreaming Sustainable Cattle Ranching" project in Colombia), building in biodiversity safeguards and assessment into programs providing assistance or land titles to rural producers to avoid perverse incentives, ensuring that climate change initiatives benefit biodiversity conservation, and better integrating separate agricultural and conservation incentive programs (*e.g.,* Socio Bosque in Ecuador) so that production and conservation objectives are mutually reinforcing.

The concepts of biodiversity and ecosystem services are often poorly understood by land and forest owners, and by society at large. As a result, forest degradation and inappropriate land use practices trigger losses in biological diversity and ecosystem services that diminish both cultural and material well-being. Well-managed protected areas have been proven to support biodiversity conservation and maintenance of ecosystem services but an appreciation of the roles of different elements of the ecosystem tends to be lacking, especially by new arrivals in areas subject to high migration and settlement in the hotspot. For example, rural landowners usually understand the value of forests to ensure clean and reliable water provision or the need to protect large game animals but they do not appreciate the significance of smaller species or maintaining habitat for those creatures and their services (*e.g.* pollination, seed dispersal, pest control). Furthermore, biodiversity conservation is generally not recognized as an important element of sustainable forest or land management but rather as something imposed by outsiders.

Conservation organizations and government officials often fail to communicate biodiversity and ecosystem service values in a clear and acceptable manner to local communities and decision makers. During the national consultation workshops, this lack of appropriate communication was mentioned as a factor contributing to confusion or indifference about protecting biodiversity and natural areas because communities may not be motivated to conserve species or sites due to their vulnerability, irreplaceability or essential services provided, but rather by a combination of economic need and cultural values.

7. CIVIL SOCIETY CONTEXT OF THE HOTSPOT

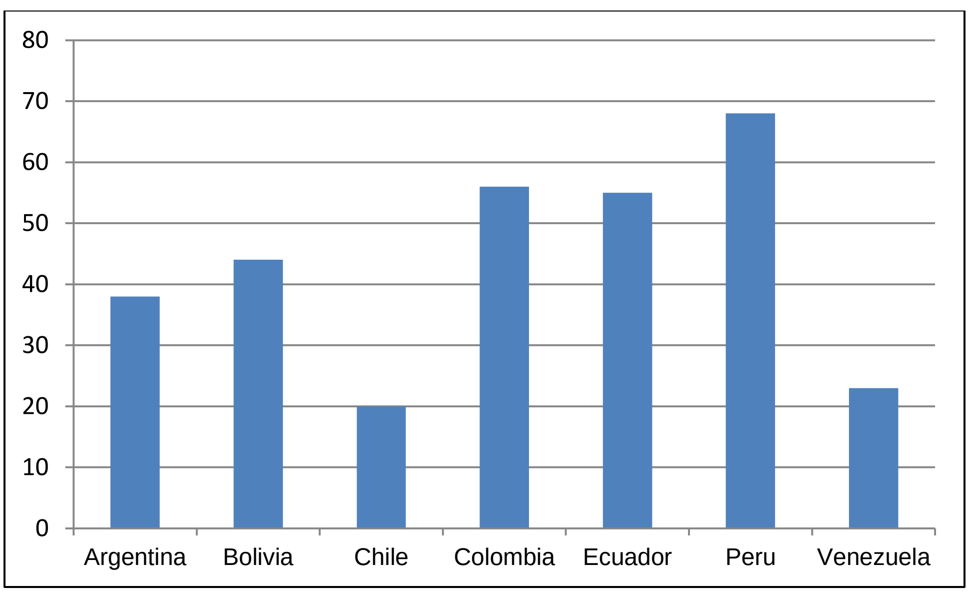
7.1 Introduction

Strengthening capacity of civil society and improving its impact and contribution to biodiversity conservation are at the core of CEPF's strategy. Civil society is understood to include national and international non-governmental stakeholders relevant to the achievement of conservation objectives and goals, including non-governmental organizations (NGOs) involved in environmental issues as well as those focused on social and community development working at the international, national and sub-national levels, scientific research and academic institutions, private sector associations, and community or grassroots organizations, especially those related to indigenous peoples. This chapter provides an overview of the legal framework, political space and funding context for civil society organizations present in the Tropical Andes.

Although the non-governmental sector in the Tropical Andes countries has historically been very active, there is a lack of published studies that systematically analyze institutional capacity to effectively influence or contribute to conservation efforts. The following discussion is based on assessments conducted by the profiling team and particularly based on information generated by the national consultation workshops.

An overview of the hotspot countries shows a significant number of civil society organizations that have potential to carry our strategies to support conservation (Figure 7.1). Peru is the country with the largest number of civil society organizations and networks identified (international, national and subnational NGOs; community-based and indigenous organizations; universities and research centers; productive organizations; and associations) and networks (68), followed by Colombia (56) and Ecuador (55). The following sections focus on these organizations, with a discussion of the networks in section 7.5.

Figure 7.1. Number of Civil Society Organizations and Networks Identified in Hotspot Countries (175 Total)



Source: Consultation workshops and this analysis 2013-2014.

7.2 Regulatory Framework and Operations

Operating context and political space

Overall the NGO sector in the hotspot countries is perceived as having a positive role in biodiversity conservation and sustainable natural resource management. Nevertheless, the current socio-economic and political context (discussed in Chapters 5 and 6) in some countries is an important challenge for NGOs, requiring careful communication and attention to strategic alignment with government institutions and policies. NGOs working on public policy, advocacy or projects in controversial areas face particular challenges, as reflected by closure and/or expulsion of some organizations and bilateral agencies. Notwithstanding this sometimes complex environment, civil society organizations continue to play a key role in supporting and complementing policy and governmental programs, especially of local and regional governments with expanded attributions and frequently limited capacities.

An example of productive civil society engagement is consultation and participation with IIRSA's executive body, the Infrastructure and Planning Council (COSIPLAN) within UNASUR (described in Chapter 6). Several organizations are working with COSIPLAN to develop mechanisms for civil society representation and guidelines for discussion and monitoring of infrastructure projects. As discussed earlier, supporting effective civil society participation in COSIPLAN appears to be strategic as it is the decision-making body that approves IIRSA's projects. As demonstrated in previous experiences supported by CEPF (*e.g.*, Pilón Lajas in Bolivia through FUNDESNAP), providing sound information on the biodiversity impacts of projects affecting priority KBAs (see Chapter 6) can have important outcomes.

The Southern Interoceanic initiative (ISur) in Peru is another good example of multi-sectoral collaboration between private companies (ODEBRECHT, *Consesionaria Interoceánica* and CONIRSA) and civil society organizations (Conservation International and Pronaturaleza) to reduce and mitigate the impacts of the Interoceanic Highway (Tracks 2 and 3). Strategies that stemmed from this effort included the Puno Civil Society Working Group, aimed at promoting local participation in mitigating the environmental and social impacts of the highway. CEPF's previous investment in the Vilcambamba-Amboró and Chocó Corridors, contributed to strengthening the capacity of several NGOs in Bolivia, Peru and Ecuador to work in association with local governments to develop sustainable land-use and planning policy (Rurrenabaque, Cuzco, Madre de Dios and northwestern Ecuador).

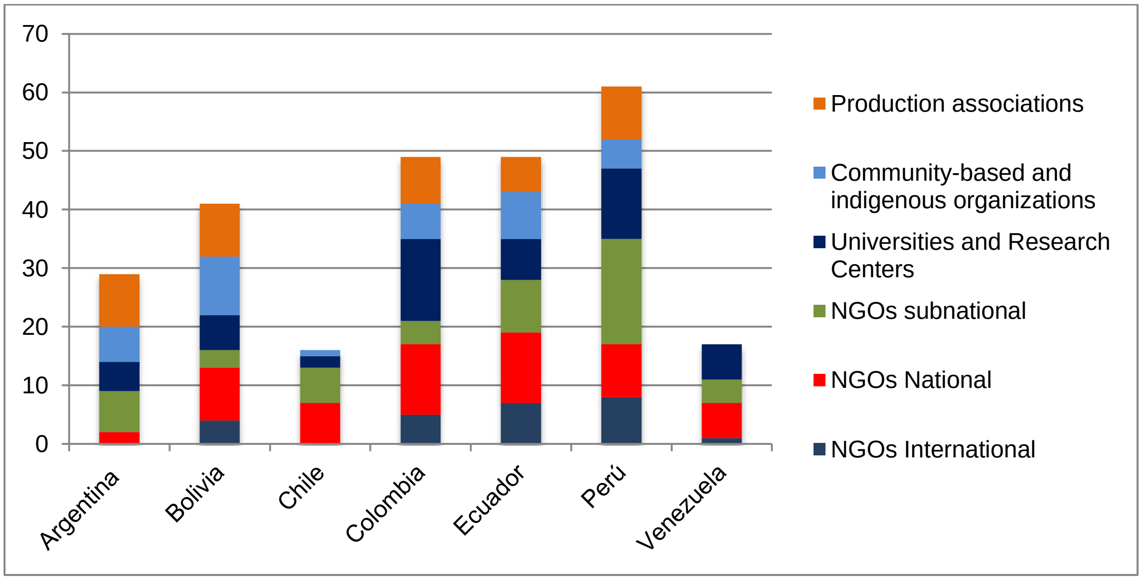
Colombia, Peru and Chile have a generally favorable climate for collaboration between NGOs and government agencies, though in Colombia the longstanding violent conflict has often placed communities and civil society organizations at grave risk. In Chile, development of the NGO sector has historically been more limited due to the strength of governmental institutions and university work. Peru has a rich set of mechanisms and experiences in collaboration between civil society organizations and government, including conservation concessions, REDD+ projects, co-management of protected areas, and ecological zoning by regional governments like San Martin and Madre de Dios.

Overall, with the economic trends towards non-renewal resources exploitation (mining and petroleum), NGOs can find themselves targets of criticism – and sometimes government intervention – undermining their capacity to act as legitimate stakeholders. On issues relating to road construction in Bolivia and petroleum and mining concessions in Ecuador, environmental organizations have found themselves criticized by government officials and sometimes by local communities. The magnitude and nature of the extractive industries expansion in the Tropical Andes is a great challenge for conservation strategies and NGO work. In order to tackle these issues strengthening institutional capacity and developing skills in conflict prevention was a frequent need highlighted by stakeholder workshop participants.

As described in Chapters 5 and 6, expansion of mining activities in hotspot countries – from large and medium scale commercial to localized (but growing) illegal operations – makes strengthening civil society capacity very important. Promoting lessons exchange from multi-stakeholder platforms led by mining companies in Peru (*e.g.*, *Mesas de coordinación de las empresas mineras* in Huánuco and Pasco in the Carpish-Yanachaga Corridor) can support capacity building in civil society organizations in Colombia, Ecuador and Argentina where mining activities are an increasing threat.

During the profiling process and consultation workshops, key civil society organizations were identified in each of the hotspot countries. While not an exhaustive list, Peru has the greatest number of organizations (61) while Chile (16), Venezuela (16), and Argentina (29) have the fewest. It should be noted that this result is in part a product of Chile's and Argentina's portions of the hotspot being relatively small (Figure 7.2).

Figure 7.2. Types of Civil Society Organizations Identified in the Hotspot (262 Total)



Source: Consultation workshops and this analysis 2013-2014

Regulatory framework

In the hotspot countries there are clear regulatory frameworks for the work of civil society, especially NGOs. All hotspot countries have government agencies in charge of registering and evaluating NGOs. In some cases, such as in Peru and Colombia, the regulatory framework to create organizations is quite simple, while in others, like Ecuador, regulation is somewhat more complex.

In Venezuela, Colombia, Bolivia and Ecuador the work of NGOs is required by law to be aligned with the priorities framed in national development plans. Whereas this requirement is in principle a positive measure to ensure complementarity between governmental and NGO efforts, NGOs must be alert to political sensitivities and authorities' interpretations of this requirement. Several multi-stakeholder platforms, often linked to protected areas management, represent important models of constructive engagement. CEPF has had previous involvement in Bolivia, Colombia, and Ecuador, offering starting points for dialogue.

In the case of Peru, NGOs (as well as the governmental sector) have to work under the principles of results-based planning, which emphasizes delivery with efficacy and efficiency. Having standardized planning and management frameworks allows for monitoring and evaluating NGOs with metrics similar to those used in the public sector, with the aim of improving standards and performance.

Another shared feature of hotspot countries is the existence of central government entities that oversee international development assistance. In Peru, for example, these agencies develop analyses of the contribution of NGOs to global assessment frameworks such as the Millennium Development Goals, or, in the case of Colombia, to national poverty reduction goals. Along with the increased funding and capacity in government institutions, this implies that CEPF investment strategies will have to be strategically coordinated with governmental guidelines. This coordination has been the norm in the past in CEPF´s investments, for example in northwestern Ecuador, Cuzco, Madre de Dios in Peru, and Rurrenabaque in Bolivia.

As subnational and local governments become protagonists in conservation efforts as a result of decentralization processes underway, NGO work with these counterparts requires more formal mechanisms for collaboration. Frequently NGOs must now establish official agreements such as memoranda of understanding in order to operate in subnational jurisdictions. This tendency is an improvement on the past as it enables a greater degree of accountability and sustainability in the partnerships, although these bureaucratic procedures take additional time, a factor which needs to be taken into account in project planning.

Funding context

NGOs in the hotspot are facing more challenges in financing their work, in part due to a reduction in available funding sources. For many European aid agencies (*e.g.,* Netherlands, Switzerland, Nordic countries and the UK, and other funding sources that follow similar guidelines) the countries of the Tropical Andes are no longer priorities for aid as their per capita incomes classify them as upper-middle-income (Argentina, Colombia, Ecuador and Peru) or high-income (Chile) countries. Bolivia is the one exception. The global economic crisis beginning in 2008/2009 has also reduced both public funding from bilateral sources and private philanthropy from foundations which are themselves financially constrained. Discussion on funding is reviewed in greater detail in Chapter 10.

An interesting trend is the growth of governmental funds for biodiversity research, albeit still in limited amounts. These new funds complement those more traditional funding options for research managed by Environmental Ministries or directly granted by universities to individual projects, and are linked to public entities that carry out science and technology policies. Examples of these types of funds were noted by workshop participants as quite effective in Chile, Venezuela, Ecuador and Colombia. Currently, these funds are available mostly to university and research centers. Nonetheless, the impact of these funds on conservation strategies, as noted in the consultation workshops, could be increased by better coordination between academia and NGOs.

A final point to consider is an increase in financial difficulties for civil society, particularly in Argentina and Venezuela, due to currency exchange policies. In these countries, dollars in the official market have a lower exchange rate than in the informal market. To reduce price escalation governments have placed restrictions in the currency exchange market (taxes, transfer costs, amounts to be traded). International funding for NGOs in these countries has to receive clearance from central government institutions, and is often delayed and reduced due to transaction costs.

7.3 Civil Society Organizations' Scopes of Work

This profile identifies 133 environmental organizations working in the Tropical Andes, although there are clearly many more organizations working at the local level or on overlapping issues. Many organizations work across both environmental and social issues, a positive element for intersectoral impact and coordination (7.1).

Table 7.1 Scope of Work of NGOs Identified in the Hotspot

	Scope of Work					
Country	**Conservation**	**Sustainable management and use of natural resources**	**Indigenous peoples**	**Social and economic development**	**Climate change mitigation and adaptation**	**Other**
Argentina	7	3	7	7	1	3
Chile	8	5	7	5	2	3
Bolivia	7	8	7	8	7	5
Colombia	4	6	3	5	4	1
Ecuador	9	14	8	6	10	3
Peru	8	7	9	5	3	5
Venezuela	1	3	0	3	1	6
Total *	**44**	**46**	**41**	**39**	**28**	**26**

Source: Consultation workshops and this analysis 2013-2014.
* The total numbers here do not coincide with the total number of organizations (133) because many work on multiple themes.

Among the environmental organizations identified there are a number that work at international, national and subnational levels with relevant experience and expertise in the hotspot (Tables 7.2 and 7.3).

Table 7.2. Key International Environmental NGOs Identified in the Hotspot Region of Tropical Andes Countries

Country	Name of organization
Bolivia	Conservation International (CI), Conservation Strategy Fund (CSF)*, The Nature Conservancy (TNC), Wildlife Conservation Society (WCS), World Wildlife Fund (WWF),
Colombia	Conservation International (CI), Rainforest Alliance, The Nature Conservancy (TNC), Wildlife Conservation Society (WCS), World Wildlife Fund (WWF)
Ecuador	Aves y Conservación-BirdLife International, Conservation International (CI), Consorcio para el Desarrollo Sostenible de la Ecorregión Andina (CONDESAN), International Union for the Conservation of Nature (IUCN)/Sur, Nature and Culture International (NCI)/ Ecuador, Rainforest Alliance, The Nature Conservancy (TNC),
Peru	CARE, CARITAS, Conservation International (CI), Frankfurt Zoological Society (FZS), Nature and Culture International (NCI), Rainforest Alliance, Wildlife Conservation Society (WCS), World Wildlife Fund (WWF)
Venezuela	The Nature Conservancy (TNC)

Table 7.3: Key Environmental NGOs Working at National and Subnational Scales in the Hotspot Countries

Country	Principal scale of action	Name of organization
Argentina	National	Fundación para el Desarrollo en Justicia y Paz (FUNDAPAZ), Greenpeace
	Subnational	Fundación Vicuñas, Camélidos y Ambiente (VICAM), Fundación Yuchán, ProYungas, Fundación para la Conservación y Estudio de la Biodiversidad (CEBIO), Fundación TEPEYAC, Acompañamiento Social de la Iglesia Anglicana del Norte Argentino (ASOCIANA), Fundación Ecoandina
Bolivia	National	Asociación Boliviana para la Conservación, Centro de Estudios en Biología Teórica y Aplicada (BIOTA), Fundación Armonía, Fundación Amigos de la Naturaleza (FAN), Fundación MedMin, Fundación Natura, Fundación para el Desarrollo del Sistema Nacional de Áreas Protegidas (FUNDESNAP), Fundación TRÓPICO, Liga de Defensa del Medio Ambiente (LIDEMA)
	Subnational	Mancomunidad de Municipios del Norte Paceño Tropical (Pelechuco y Apolo), Protección Medio Ambiente-Tarija (PROMETA),
Chile	National	Así Conserva Chile, Casa de la Paz, Chile Sustentable, CODEFF, Fundación TERRAM, Parque Katalapi, Sendero de Chile
	Subnational	Corporación de Estudios y Desarrollo Norte Grande, Centro de Estudios del Hombre del Desierto, Centro de Estudios de Humedales, Centro de Investigación del Recurso Hídrico (CIDERH), Confraternidad Ecológica Universitaria, ProEcoServ
Colombia	National	Censat- Agua Viva, Centro de Investigación de Producción Agropecuaria Sostenible (CIPAV), Fundación Humedales, Fundación Natura, Fundación para la conservación del Patrimonio Natural de Colombia, Fundación para la Defensa del Interés Público, Fondo para la Acción Ambiental y Niñez, Fondo Patrimonio Natural, Fundación Tropenbos, ProAves, Red de Reservas de la Sociedad Civil (RESNATUR)
	Subnational	Corporación Serraniagua, Fundación Conserva, Fundación Pro-Sierra Nevada de Santa Marta, Fundación Zoológico de Baranquilla (FUNDAZOO)

Country	Principal scale of action	Name of organization
Ecuador	National	Centro de Derecho Ambiental (CEDA), Corporación ECOPAR, Corporación Gestión y Derecho Ambiental (ECOLEX), EcoCiencia, Fundación Futuro Latinoamericano (FFLA), Fundación Jocotoco, Fondo Ambiental Nacional (FAN), Fondo Ecuatoriano Populorum Progressio (FEPP), Programa Face de Forestación (PROFAFOR), Red de Bosques Privados del Ecuador, SAMIRI-PROGEA
	Subnational	Fundación Altrópico, Corporación Randi-Randi, Ecofondo, Fundación Arco Iris, Fundación Cordillera Tropical, Fundación Golondrinas, Fundación Paz y Desarrollo, Fundación Maquipucuna, Fondo para la Protección del Agua (FONAG)
Peru	National	Asociación para la Investigación y Desarrollo Integral (AIDER), Asociación Peruana para Conservación (APECO),Centro de Estudios y Promoción del Desarrollo (DESCO), Derecho Ambiente y Recursos Naturales (DAR), Fondo de las Américas (FONDAM), ITDG-Soluciones Prácticas, ProNaturaleza, PROVIDA, Sociedad Peruana de Derecho Ambiental (SPDA)
	Subnational	Aldea Yanapay /Cuzco, Amazónicos por la Amazonia (AMPA), Asociación de Conservación de la Cuenca Amazónica (ACCA), Asociación de Ecosistemas Andinos (ECOAN), Asociación Especializada para el Desarrollo Sostenible (AEDES), Asociación Ecológica del Sira (ECOSIRA), Asociación Proyecto Mono Tocón, Asociación de Producción y Desarrollo Sostenible (APRODES), Asociación de Promoción y Desarrollo "El Taller", Centro de Estudios Andinos Regionales "Bartolomé de las Casas" (CBC), Centro de Estudios para el Desarrollo Regional (CEDER), Centro de Investigación y Desarrollo Selva Alta (CEDISA), Estudios Amazónicos (URKU), Instituto de Cultivos Tropicales (ICT), Fundación Huamanpoma de Ayala/Cuzco, GRUPO GEA, Instituto de Desarrollo y Medio Ambiente (IDMA)
Venezuela	National	Asociación Venezolana para la Conservación de Áreas Naturales (ACOANA), Acción Campesina, Cátedra de la Paz y Derechos Humanos "Mons. Oscar Arnulfo Romero", ConBiVe, Fundación Tierra Viva, Provita
	Subnational	Fundación La Salle, Fundación Programa Andes Tropicales, Geografía Viva,Tatuy

7.4 Overview of Civil Society Organizations

Environmental Non-Governmental Organizations

Civil society and non-governmental organizations have played an important role in the implementation of innovative strategies for biodiversity conservation in the countries of the Tropical Andes Hotspot. Many date back to the 1980s, with marked growth in the early 1990s after the Earth Summit in 1992 and the signing of the Convention on Biological Diversity (CBD). During those years, non-profit organizations flourished in numbers, scope of action and influence on policy and regulatory frameworks. Several of the organizations created over twenty years ago such as *Fundación Natura* in Colombia, *EcoCiencia* in Ecuador and *Sociedad Peruana de Derecho Ambiental (SPDA)* in Peru remain key players in their national context. The deep experience of many national NGOs in the Tropical Andes Hotspot is an important advantage for CEPF and other conservation investments.

In addition to the global push for conservation efforts that the CBD sparked, the expansion of initiatives from the non-governmental sector in the Tropical Andes in the 1990s-2000s occurred in part as a response to weak governmental institutional capacity and regulatory frameworks. In the hotspot countries, Ministries of the Environment are of relatively recent creation, Chile's being the newest (replacing in 2011 the National Environmental Commission, *CONAMA*, which had existed since 1993). With contributions from NGOs and international development agencies, comprehensive legislation on biodiversity and protected areas has been expanded over the last twenty years. This successful track record has aided in the recognition of the importance of NGOs as partners in conservation efforts, although as discussed earlier in this chapter and in Chapter 10, funding for NGOs is constrained, with the bulk of financial and technical assistance for conservation currently flowing to government agencies.

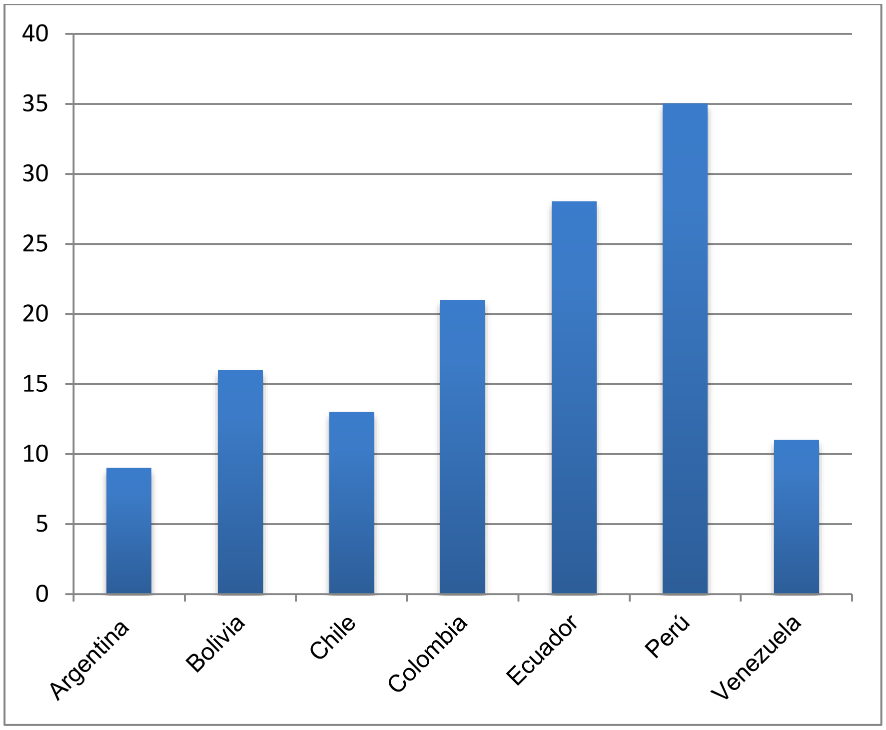
The worldwide recognition of the Tropical Andes as a major biodiversity hotspot spurred increased involvement of several international organizations, which in partnership with national and local organizations have achieved significant results: the creation and improvement of protected areas management; innovative schemes for participatory protected area management, especially with indigenous people; and a large body of research and community-led practices in sustainable natural resources use and ecosystem services payment mechanisms.

Today, the accumulated experience of the NGO sector in the hotspot countries is evident. All countries have a wide range of NGOs, with significant technical expertise and the ability to cooperate with various sectors (government, academia, business and social organizations). However, to realize their full potential and consolidate their efforts there are still significant resource and capacity limitations to be overcome, discussed in greater detail in the following sections.

Complementing the trend towards governmental decentralization described in the preceding chapter, it is worth noting the important role and capacities of several organizations working primarily at the sub-national level (*e.g.*, P*roYungas* in Argentina, *Amazónicos por la Amazonía (AMPA)* in Peru, *Fundación Pro-Sierra Nevada de Santa Marta* in Colombia), though these, and many other local organizations, still face technical and resource constraints to realizing their potential.

During the workshops and research for this profile, 133 international, national and subnational NGOs were identified working in the hotspot region of the Tropical Andes countries. As mentioned previously, most NGOs focus on traditional conservation activities, and less on emerging areas such as sustainable financing, REDD+ and payments of ecosystem services. Peru with 35 and Ecuador with 28 organizations have the largest identified NGO community (Figure 7.3). Among those identified, 25 were international, 58 national and 51 subnational.

Figure 7.3. Number of Environmental NGOs Working in the Hotspot Region of Tropical Andes Countries (133 Total)



Source: Consultation workshops and this analysis 2013-2014

The NGOs operating in the hotspot have created a vibrant organizational fabric that is a clear opportunity for conservation investment. There are however a number of challenges and constraints to consider. One is the broad variation in technical and funding resources among NGOs. In all of the hotspot countries, subnational or local organizations were assessed as having limited technical staff and insufficient funding, while national organizations are also facing funding challenges. Second, with stronger governments and an increase in public budgets for biodiversity conservation, the role of NGOs and cooperation agencies is changing, warranting a careful of review of new opportunities and how interventions can be most effective. To increase their effectiveness, several national and international NGOs in countries such as Ecuador and Bolivia have refined their strategies to work more closely with governments. Subnational NGOs in Peru and Venezuela partner with local governments as a strategy for creating sustainable outcomes. There is a clear need for NGOs elsewhere to innovate in their engagement strategies with governments (*i.e.* at national and subnational levels), private sector and indigenous and community-based organizations by fostering collaborative interventions rather than working alone. Doing so will enhance their impact and sustainability.

Indigenous peoples and community organizations

Social, community-based and indigenous organizations comprise another segment of civil society that plays a key role in the hotspot countries. Indigenous peoples' organizations, roughly in parallel with the growth in conservation NGOs, gained important recognition in all of the hotspot countries in the last 30 years. Between 1990 and 2000, indigenous organizations were pivotal in the drafting of legislation to guarantee territorial rights and political representation. Thanks to their impact, as discussed in Chapter 6, regulatory frameworks today in hotspot countries recognize the contribution of indigenous peoples, ensuring – at least on paper – territorial rights and benefits from biodiversity conservation. The recognition of the enormous contribution of indigenous people to conservation initiatives has led to some constructive multi-stakeholder partnerships with NGOs and government institutions in the hotspot. The Tropical Andes Hotspot offers abundant examples of protected areas co-management, biodiversity monitoring and ecological zoning with the active participation of indigenous and local communities. In countries such as Bolivia, Ecuador and Peru the overlap of protected areas with indigenous territories has allowed the testing of a wide array of sustainable management and natural resource use schemes often organized as management committees, with lessons that have inspired other countries. For example, the *Consejo Regional T'simane Mosetene* (CRTM) supported by CEPF is an inspiring experience of indigenous-led governance in protected areas (Pilón Lajas Biosphere Reserve). In Ecuador the multi-stakeholder groups in the Sumaco Napo Galeras Biosphere Reserve (Parque Nacional Sumaco Napo-Galeras and Baeza Lumbaqui KBAs) also offer positive lessons for participative sustainable management. Protected Areas management committees are important spaces for community engagement, with varying degrees of success. During consultations in some countries and regions they were mentioned as important stakeholders, while in others they were seen as less significant, perhaps due to their informal and/or intermittent nature.

In the hotspot portions of the seven countries, a total of 35 community-based and indigenous organizations were identified (Figure 7.4 and Table 7.4). Bolivia with ten and Ecuador with eight have the largest number while Chile (1) and Venezuela (none) are the countries with fewest organizations.

Figure 7.4. Number of Community-based and Indigenous Organizations Identified in the Tropical Andes Hotspot Countries (36 Total)

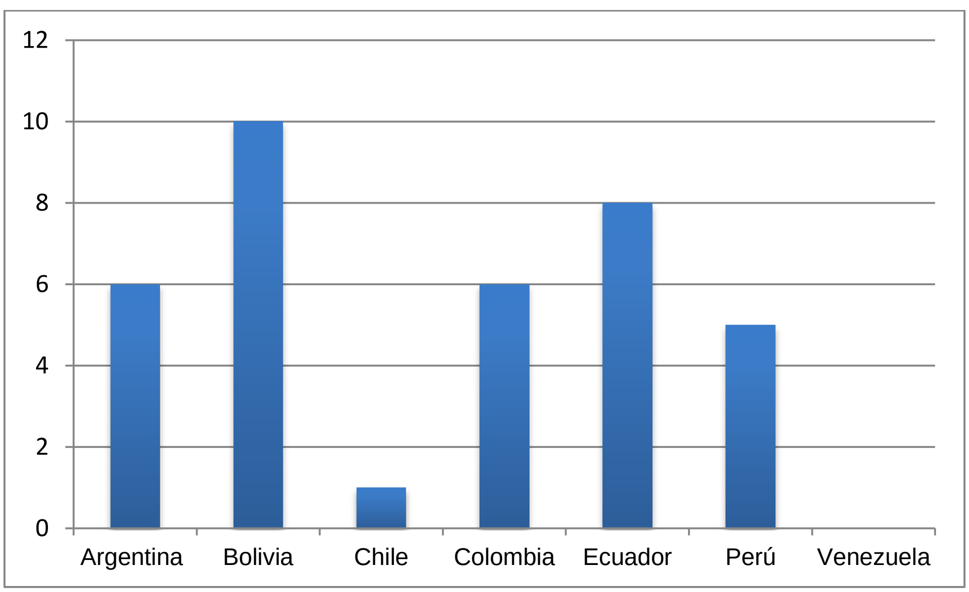


Table 7.4. Community-based and Indigenous Organizations Present in the Hotspot Regions of the Tropical Andes (by country)

Country	Principal Scale of Action	Name of Organization
Argentina	National	Organización Nacional de Pueblos Indígenas de la Argentina (ONPIA)
	Subnational	Asambleas de los Pueblos Guaraníes (in Tucumán, Jujuy, Salta provinces), Asociación Diaguita de Tucumán, Communities of the Valle de Tafi, Consejo de Organizaciones Aborígenes de Jujyuy (COAJ), Indigenous and local communities in Rinconada
Bolivia	National	Confederación de Organizaciones Indígenas de Bolivia (CIDOB)
	Subnational	Central Indígena de Mujeres Lecas de Apolo (CIMLA), Central Indígena del Pueblo Leco de Apolo (CIPLA), Consejo Regional T'simane Mosetene (CRTM), Coordinadora de Pueblos Indígenas del Trópico de Cochabamba (CPITCO), Federación Originaria Intercultural de Yungas de Carijana (FOYCAE), Federación Única de Trabajadores Bautista Saavedra, Federación Única de Trabajadores Campesinos Franz Tamayo, Nación Kallawaya, Pueblo Indígena Leco y Comunidades Originarias de Larecaja (PILCOL)
Chile	Subnational	Consejo Nacional Aymara (in Iquique, Arica and Parinacota provinces)
Colombia	National	Proceso de Comunidades Negras (PCN), Consejo Territorial de Cabildos, Organización Nacional de Cabildos indígenas (ONIC)
	Subnational	Asociación de Desarrollo Campesino del Norte del Cauca (ARDECAN), Consejo Regional Indígena del Cauca (CRIC), Resguardos Indigenas of Arhuaco, Kogui-Malayo-Arhuaco and Kankuamo
Ecuador	National	Confederación Kichwa del Ecuador (ECUARUNARI), Conferderación Nacional de Organizaciones Campesinas, Indígenas y Negras (FENOCIN)
	Subnational	Federación de Centros Awa del Ecuador (FCAE), Federación de Centros Chachis del Ecuador (FECCHE), Federación Ecuatoriana de Indígenas Evangélicos (FEINE), Federación Interprovincial de Centros Shuar (FICHS), Indigenous (Kichwa, Quijos, Shuar) and Afro-Ecuadorian Associations, Nacionalidad Shuar del Ecuador (NASHE)
Peru	National	Asociación Interétnica de Desarrollo de la Selva Peruana (AIDESEP), Confederación de Nacionalidades Amazónicas del Peru (CONAP)
	Subnational	Comité de Gestión Bosques in Cuzco, Indigenous, native and campesinos communities (Washipaeri, Ashsaninka, Matshigenka), Organización de comunidades Awajun en la Cordillera del Cóndor (ODECROFOC)

Source: Consultation workshops and this analysis 2013-2014

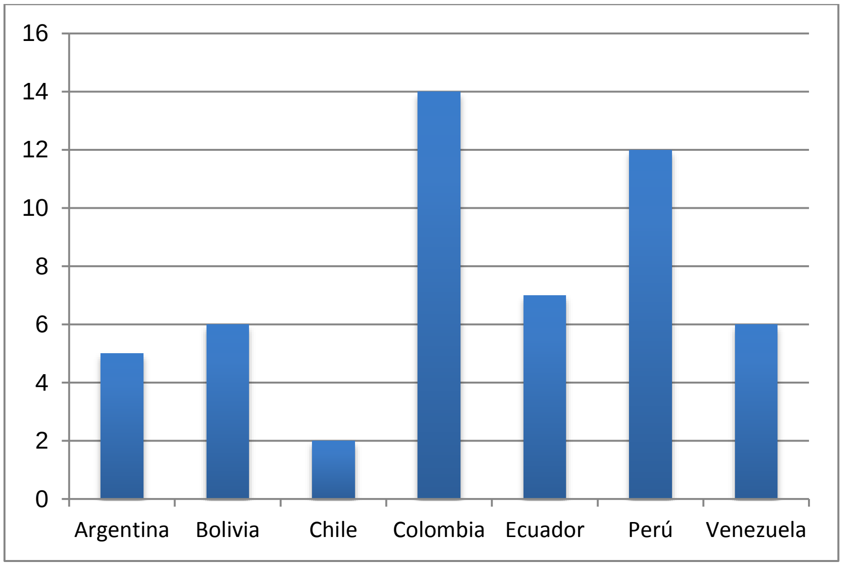
Unfortunately, many organizations have institutional shortcomings, especially in their technical, financial and managerial capacity. Although grassroots organizations are active on the front lines of territorial management, they generally have more limited institutional capacities than national counterparts (listed in Table 7.4). It is worth mentioning one regional organization, the Amazon Basin Indigenous Organizations Confederation (COICA) a pan-Amazonian organization with membership of national indigenous organizations. Across the hotspot indigenous organizations have gained important political recognition and are able to negotiate better with other stakeholders such as governments and the private sector. Their influence on policy decisions remains limited, especially for the expansion of road infrastructure and extractive industries in their territories.

There are several points of convergence and collaboration between indigenous organizations and the NGO sector, especially in relation to protected areas that overlap indigenous territories. In all of the countries there are significant lessons that have been learned on how to promote governance systems that reconcile conservation objectives with demands for territorial autonomy. These lessons can inspire best practices elsewhere through active exchange and network building. Nevertheless, governance practices in protected areas that overlap indigenous territories need to incorporate and adapt to changes in the socioeconomic, political and development context. Addressing emerging issues such as sustainable livelihoods, food security, mining, infrastructure and climate change at local levels require innovation in the conservation approaches, and developing skills both in NGOs and indigenous organizations. Several community-based and indigenous organizations' work in conservation is worth recognizing. These include the community-based organization Serraniagua Corporation in Tatama National Park in Colombia, Kichwas organizations in Sumaco Napo Galeras Biosphere Reserve, Shuar organizations in Podocarpus National Park and the Awá Federation (a CEPF partner) near the Cotacachi-Cayapas Ecological Reserve in Ecuador. Exchanging lessons learned from these experiences between the organizations in the hotspot can spur the replication of good practices.

Academia

In the hotspot there is a significant body of scientific knowledge and capability in academic institutions, including universities and research centers at national and subnational levels. During the profiling process 53 important universities and research centers were identified with work relating to conservation and biodiversity research in the hotspot (Figure 7.5 and Table 7.5). Colombia leads with 14 and Peru with 12, Chile with the smallest portion of the hotspot has two research centers (The Ecology and Biodiversity Institute of the Universidad de Chile and the Arid Zones Research Center, CEAZA, of the Universidad Católica del Norte).

Figure 7.5. Number of Universities and Research Centers Identified in the Tropical Andes Hotspot (by Country; 52 Total)



Source: Consultation workshops and this analysis 2013-2014

Table 7.5. Universities and Research Centers Identified in the Hotspot Countries

Country	Names of universities and research centers
Argentina	Facultad de Veterinaria/Cátedra de Vida Silvestre-Universidad Católica de Salta, Instituto de Ecología Regional -Universidad Nacional de Tucumán, Laboratorio de Investigaciones Microbiológicas de Lagunas Andinas (PROIMI-CONICET), Universidad de Jujuy (UNJU), Universidad de Salta (UNAS)
Bolivia	Centro de Biodiversidad y Genética - Universidad Mayor de San Simón, Centro de Biodiversidad y Recursos Naturales (BIORENA)- Universidad San Francisco Xavier, Colección Boliviana de Fauna, Herbario Chuquisaca - Universidad San Francisco Xavier, Herbario Nacional de Bolivia, Instituto de Ecología de la Universidad Mayor de San Andrés, Museo de Historia Natural Noel Kempff Mercado
Chile	Centro de Estudios Avanzados de Zonas Áridas (CEAZA) -Universidad Católica del Norte, Instituto de Ecología y Biodiversidad-Universidad de Chile,
Colombia	Centro de Estudio Técnicos (CETEC), Facultad de Ciencias Ambientales - Universidad Tecnológica de Pereira, Instituto de Ciencias Naturales - Universidad Nacional de Colombia, Instituto de Investigación en Recursos Biológicos Alexander von Humboldt, Pontificia Universidad Javeriana, Universidad del Atlántico, Universidad de Antioquia, , Universidad de la Guajira, Universidad ICESI Valle del Cauca, Universidad La Salle de Bogotá, Universidad de los Andes, Universidad de Magdalena (UniMag), Universidad de Medellín, Universidad del Valle
Ecuador	Universidad de Cuenca, Universidad Estatal Amazónica (UEA), Universidad Nacional de Loja, Universidad San Francisco de Quito (USFQ), Universidad Tecnológica Indoamérica, Universidad Técnica Particular de Loja (UTPL), Pontificia Universidad Católica del Ecuador (PUCE)
Peru	Universidad de Amazonas, Universidad Andina/Cuzco, Universidad Nacional de San Agustín /Arequipa, Universidad Nacional de San Antonio Abad/Cuzco, Universidad Nacional de San Martin (UNASM), Universidad Católica San Pablo/Arequipa, Universidad Católica Santa María/Arequipa, Universidad Cesar Vallejo, Universidad Nacional Agraria La Molina (UNALM), Universidad Nacional

Country	Names of universities and research centers
	Hermilio Valdizán (UNEVHAL), Universidad Nacional de Madre de Dios, Universidad Nacional Mayor de San Marcos, Universidad Tingo María
Venezuela	Fundación La Salle de Ciencias Naturales/Museo de Historia Natural, Instituto Venezolano de Investigaciones Científica (IVIC), Universidad de los Andes, Universidad Central de Venezuela, Universidad Simón Bolívar, Universidad Valle del Momboy

Source: Consultation workshops and this analysis 2013-2014

While lack of funding makes it difficult to keep biodiversity information current, there is significant capability to carry out comprehensive research, to address knowledge gaps and contribute to conservation strategies. A duplication of research efforts and lack of coordination stand out as recurrent problems and, as participants in the workshops observed, reflects the lack of a comprehensive research agenda on biodiversity. Biodiversity researchers and institutions tend to have weak connections with other stakeholders, especially NGOs, private sector and indigenous organizations. The academic sector frequently works in isolation, thus diminishing its influence. Making research inform policy decisions, enhance experiences and projects lead by NGOs, and inspire innovative practices in businesses, are key challenges. Strengthening research networks, communications and coordination with other sectors and actors would contribute to generating and applying scientific knowledge more effectively. There are several universities and centers with ample expertise in biodiversity research that can lead collaborative initiatives and knowledge transference, among them: the Institute Alexander Von Humboldt in Colombia) and La Molina National Agricultural University (UNALM) in Peru.

Private Sector

A characteristic of the work of NGOs in the hotspot is their generally weak engagement with the private sector that reduces their ability to effectively influence long-term strategies. Participants in national workshops highlighted this as a critical limitation that needs strengthening, particularly as extractive industries and commercial agriculture expand in the hotspot. Although a false dichotomy between conservation and economic development still strains relationships, there are an increasing number of positive partnerships with businesses, for example in Peru with the Alto Mayo REDD+ initiative. In Venezuela, *Provita* receives funding for species and ecosystem conservation research from a number of private businesses, both national and international *(e.g.*, Empresas Polar, General Electric, Citi, Shell). In Argentina *ProYungas* has a sustainable production agreement with a local sugar cane industry (LEDESMA) which has operations in the vicinity of the Yungas Biosphere Reserve. Experiences in Colombia, with the recent enactment of a biodiversity compensation regulation (*Ministerio de Ambiente y Desarrollo Sostenible* 2012) and Peru, with the environmental services law being discussed in Congress (MINAM 2013), offer opportunities for setting up innovative schemes with the private sector. The challenge is still how to multiply, connect and scale-up these efforts.

A set of civil society stakeholders that play an important and dynamic role in the hotspot are private sector producers and industry associations, including farmers, cattle ranchers, forestry companies and ecotourism operators. These activities constitute key threats to conservation in the hotspot, but by the same token, their members and associations play a critical role in land management and stewardship. Increasingly, these associations have become strong partners in conservation efforts. Coffee and cocoa producers associations in Ecuador and Peru (*Asociación Ecuatoriana del Cacao Nacional fino de Aroma*, ACEPROCACAO; *Cooperativa de Servicios*

Múltiples, CAPEMA; *Cooperativas Agrarias Cafetaleras de los Valles de Sandia,* CECOVASA) that have improved sustainable practices are good examples to replicate.

Particularly in Colombia, where there is a strong tradition of association, industry organizations (*e.g.,* the Colombian Coffee Growers' Federation, FEDECAFE) have strong institutional capacity and are involved in several programs including certification initiatives with Rainforest Alliance, and previous support from CEPF in the Chocó. The case of sustainable cattle ranching initiatives lead by the *Federación de Ganaderos Colombianos* (FEDEGAN) in the Cordillera Central of Colombia is illustrative of the powerful potential synergy between improved production systems and conservation. FEDEGAN has a national-level target of returning to nature 10 million hectares of marginal pastures while improving productivity through more biodiversity-friendly silvopastoral systems.

In the national consultation workshops, promoting sustainable production practices was consistently indicated as a key strategy to address local economic and conservation needs. Although there are a number of innovative sustainable production experiences in the hotspot countries, most are still relatively small scale and disconnected from each other. This fragmentation has resulted in their still limited influence in national economic development strategies. Again, at subnational levels where many governments are searching for alternative strategies as a means of market differentiation, there is room for innovation and influence. Some illustrative examples are the sustainable cocoa production hub in Ecuador (Napo Province) and organic coffee producers in the Puno and San Martín regions in Peru (*e.g*., CAPEMA and CECOVASA). CEPF's previous work has supported conservation coffee initiatives in both of these countries. In Peru, through Conservation International, coffee producers have been connected to international companies such as Starbucks. In Bolivia, three highly successful Associations are the coffee producers (affiliated to *Central Indígena del Pueblo Leco de Apolo,* CIPLA) and the Mapiri Cocoa Producers Association (APCAO), both linked to the Tacanas National Park, a KBA. These have been previously supported by CEPF.

As mentioned in the previous chapter, the connectivity work carried out by the Serraniagua Corporation is a good model on how to integrate sustainable coffee with community-based tourism initiatives. In Argentina, Las Queñoas Community Tourism Association (ATUCOQUE) and Red Puna are also examples of rural communities´ participation in nature-based tourism.

The extractive and infrastructure sectors have significant and often negative environmental footprints, though in principle these entities may also be important allies or funders for conservation – either under their legal obligations such as the aforementioned biodiversity offsetting provisions in Colombia or through voluntary efforts. Unfortunately, working examples of these alliances in this sector are still relatively scarce, and high profile projects like the Camisea gas field and pipeline in Peru highlight the risks and potential conflicts (Munilla 2010, World Wildlife Fund undated). While corporate social responsibility initiatives have grown in the region, there are only few directly linked to biodiversity conservation. An interesting case is *EcoFondo* (Ecofund), a private ecological trust fund established in 2001 by the company owning and operating a heavy crude pipeline in Ecuador (OCP Ecuador), following successful negotiations with Ecuadorian environmental organizations. It co-finances conservation projects in the area of influence of the pipeline. As mentioned earlier in this chapter, the ISur initiative, around the Interoceanica Sur highway, is also a key illustration of positive NGO engagement with private companies. Table 7.6 highlights some conservation initiatives with private sector involvement and Table 7.7 lists the producers associations identified in the hotspot countries. Other examples of civil society and private sector partnerships include the Conservation International/BHP-Billiton Alliance in Chile and Green Gold, an initiative to obtain certified gold supported by CEPF in the Colombian Chocó. Further civil society engagement with the private sector is also reviewed in Chapter 10 in the discussion on water funds.

Table 7.6. Conservation Initiatives Involving the Private Sector in the Tropical Andes Hotspot

Country	Private Sector Entity	Description
Argentina	Asociación de Turismo Comunitario Las Queñoas (ATUCOQUE)	A network of community-based tourism operators that work in the area surrounding the Yungas Biosphere Reserve. ProYungas and the Provincial Government of Jujuy are supporting their work.
Bolivia	Asociación de Productores de Cacao (APCAO) Mapiri and Apolo	Association of small cocoa producers in the buffer zones of Madidi, Pilón Lajas, and Apolobamba National Parks. It is supported by the Wildlife Conservation Society and municipal authorities.
	Productores de Café de Sombra affiliated with Central Indígena de Pueblos Leco (CIPLA)	Group of small coffee producers linked to the indigenous organization Central Indígena de Pueblos Leco (CIPLA). Wildlife Conservation Society and municipal authorities support their work.
Colombia	Federación Nacional de Cafeteros (FEDCAFE)	Engagement with certifications and standards for sustainable coffee including Conservation International, Rainforest Alliance, UTZ and others.
	Federación Nacional de Ganaderos (FEDEGAN)	Sustainable ranching program in partnership with CIPAV, Fondo para la Acción Ambiental y la Niñez, The Nature Conservancy, World Bank and GEF.
Ecuador	EcoFondo	A private ecological trust fund established by the company owning and operating a heavy crude pipeline in Ecuador (OCP Ecuador). It funds a number of projects with NGOs and universities. It also supports protected areas managers and rangers by financing a training program jointly developed with the Ministry of Environment.
	Asociación Ecuatoriana del Cacao Nacional Fino de Aroma (ACEPROCACAO)	The national network of small cocoa producers that aims to improve their exports through training and capacity building. It has a number of partnerships with cooperation agencies such as GIZ and municipal governments across the country.
Peru	Iniciativa Interoceánica Sur (ISur)	A multi-sectoral collaboration program lead by ODEBRECHT that seeks to reduce and mitigate the impacts of the Interoceanic Highway. Its partners are: *Consesionaria Interoceánica, CONIRSA,* Conservation International and Pronaturaleza.
	Alto Mayo REDD+ project	Conservation International carbon offset project in partnership with Disney and the National Protected Areas Service
	Cooperativas Agrarias Cafetaleras de los Valles de Sandia (CECOVASA)	Groups small coffee producers in Puno nearby the Bahuaja Sonene National Park and Tambopata National Reserve and aids them in certification and exports.
	Cooperativa de Servicios Múltiples (CAPEMA),	Works with small coffee producers in Moyobamba, San Martín, assisting with exports.

Source: Consultation workshops and this analysis 2013-2014

Table 7.7. Producers Associations Identified in Hotspot Countries

Country	Producers Associations
Argentina	Asociación Forestal e Industrial de Jujuy, Asociación de Obrajeros de Orán, Instituto de Cultura Popular (INCUPO), Organización de la Ruta 81, ProGrano
Bolivia	Artesanos y artesanas afiliadas al CIPLA, Asociación de Turismo Comunitario Pacha Trek, Asociación Eco turística de Agua Blanca, Asociación de Productores de Coca (ADEPCOCA)/Yungas, Asociación de Productores de Cacao (APCAO) Mapiri, Asociación de Productores de Café de Apolo (APCA), Asociación Turística Comunitaria Lagunillas, Productores de Café de Sombra afiliados al CIPLA, Productores de incienso afiliados al CIPLA
Colombia	Artesanías Colombia, Asociación de Apicultores de Boyacá, Asociación de Cafés Especiales, Apisierra- Artesanos de Carzola, Federaciones y asociaciones de ganaderos (FEDEGAN), Federación Nacional de Cafeteros (FEDECAFE), Red Colombia Verde (RCV), Red EcoSierra
Ecuador	Asociación de Operadores Turísticos del NorOccidente de Pichincha, Asociaciones de Productores de Cacao, Asociaciones de Productores de Café, Corporacion Yunguilla,Mesas sectoriales vinculadas a la Reserva de Biosfera Sumaco, Red de economía solidaria-productores (Mundo Verde)
Peru	Asociaciones y Comités de Regantes, Asociaciones de Manejo de Bosques, Asociación de productores y cooperativas, Asociaciones productivas de Cacao (Amazonas y San Martín), Asociaciones productivas de Café (Amazonas y San Martín), Asociaciones de turismo comunitario (Cuzco), Comités de Gestión de Áreas Protegidas, Empresa Stevia, Mesa Centro de las empresas mineras

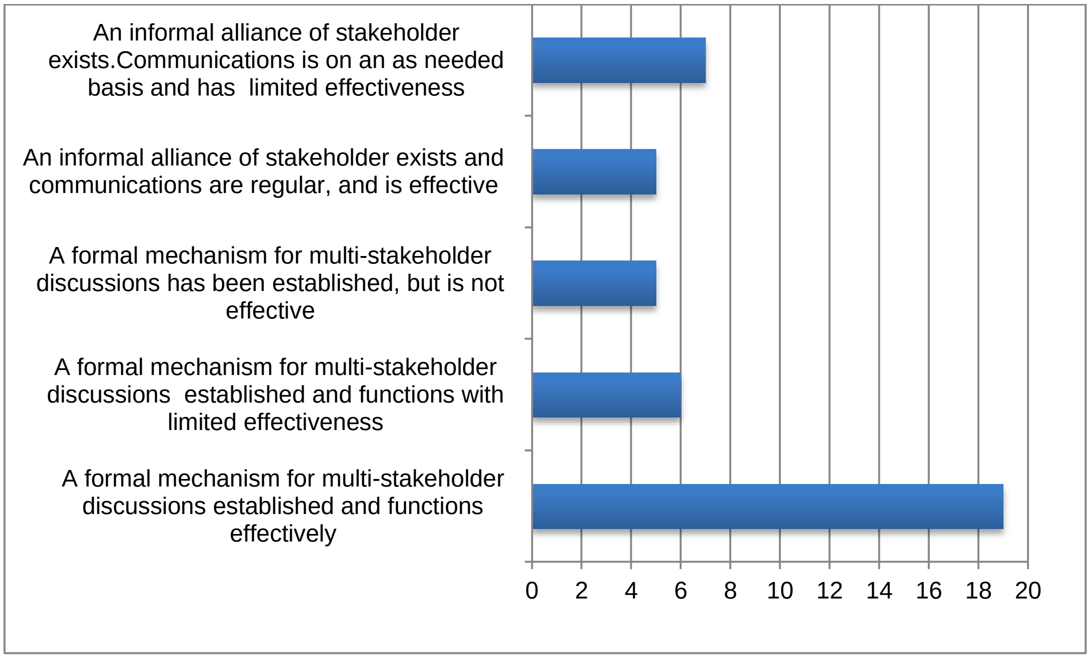
Source: Consultation workshops and this analysis 2013-2014.

7.5 Civil Society Networks

While there are a significant number and variety of networks including civil society organizations (Figure 7.6), there is room for expanding and strengthening these. A total of 42 networks were identified (Table 7.8) of which 45 percent are formally constituted.

Included in these formal networks were those (1) established by governments and linked to particular initiatives (*e.g.*, Mesa REDD in Peru, Wetlands and Biodiversity Committees in Chile); (2) associated with protected areas such as management committees (*e.g.,* Biosphere Reserves Networks in Bolivia, Argentina); and (3) connecting private stakeholders and NGOs that own natural reserves (*e.g., Red de Reservas de la Sociedad Civil* (RESNATUR) in Colombia, *Red de Bosques Privados* in Ecuador). However, there are also many informal networks, which have voluntary membership and generally do not have a recognized status under domestic regulations but play a role in information exchange and capacity strengthening. From the total number of networks identified, 17 percent were classified as informal with moderate effectiveness. Effectiveness was assessed during the consultation workshops using the criteria of CEPF's monitoring framework.

Figure 7.6. Number of Networks of Civil Society by Type and Condition of Effectiveness in the Countries of the Tropical Andes Hotspot (42 Total)



Source: Consultation workshops and this analysis 2013-2014.

Table 7.8. Civil Society Networks (Formal and Informal) Identified in the Tropical Andes Hotspot

Country	Civil Society Networks
Argentina	Consejo Asesor del Comité para el Desarrollo de las Regiones Montañosas, technical network coordinated by the government
	Red Flamencos, network of flamingo researchers in Chile, Bolivia, Argentina and Peru
	Red Puna, network of indigenous and peasant communities from la Puna and Quebrada de Jujuy
	Espejo de Sal, network of community and indigenous organizations to foster sustainable tourism
	Red Agroforestal, network of over 15 organizations that promote agroforestry production in Salta and Jujuy provinces
	Redes Chaco, network of networks that coordinates NGOs, community-based organizations, private sector and research centers to promote sustainable development in the Chaco biome
	Grupo Promotor de la Reserva de Biosfera Yungas, multi-stakeholder forum established for sustainable and collaborative management of the Yungas Biosphere Reserve
	Red Nacional de Áreas Protegidas Privadas, national network of private protected areas, coordinated by Fundación Vida Silvestre
	Red de Reservas de Biosfera, national network of Biosphere Reserves in Argentina coordinated by the MAB Committee
Chile	Red Flamencos, network of flamingo researchers in Chile, Bolivia, Argentina and Peru. In Chile government officials and technical staff from mining companies are also members
	Comités de Gestión Pública de Humedales, government-led network of wetlands researchers

Country	Civil Society Networks
	Comités de Gestión Pública de Biodiversidad, government-led network of researchers in biodiversity
	Red Alianza Gato Andino, research network focused on the Andean cat
Bolivia	Liga de Defensa del Medio Ambiente (LIDEMA), network of 27 environmental organizations present in nine departments in Bolivia[1]
	Confederación de Ayllus y Markas del Qullasuyo (CONAMAQ), network of indigenous organizations in La Paz, Potosí, Chuquisaca and Cochabamba
	Confederación de Pueblos Indígenas de Bolivia (CIDOB), federation of 34 indigenous peoples´ organizations present in seven of the nine departments[2]
Colombia	RESNATUR, network of civil society organizations with nature reserves, with over 280 members across the country
	Red de Agricultura Sostenible, national network of Rainforest Alliance certified producers
	Red de organizaciones por el Agua, linked to CENSAT-Agua Viva, network of community organizations that promote sustainable watershed management
	Red de Custodios de Semillas, network of community organizations in the Macizo Colombiano
	Red de Alter Extractivismo, network opposed to extractive activities
	Red de Consejos Comunitarios del Pacífico Sur RECOMPAZ, network of Afro- descendant organizations mainly in the Chocó region
	Red de Turismo Sostenible, promotes exchange and best practices in sustainable tourism, with a large number of members across the country (community-based operations, medium and large-size operations). The Vice-Ministry of Tourism and Parques Nacionales de Colombia are part of the coordination committee
Ecuador	ARA – Amazon Regional Network/Ecuador, network with 11 members acting in the Amazon region
	CEDENMA – Comité Ecuatoriano por la Defensa de la Naturaleza y el Medio Ambiente, national network of more than 40 environmental organizations
	REDISAS- Red de Interesados en Servicios Ambientales, learning platform on environmental services
	Confederación Ecuatoriana de Organizaciones de Sociedad Civil, recently created network of over 40 organizations of all types (social, environmental, education, etc.)
	Red de Bosques Privados del Ecuador, national network of owners of forest reserves
	Grupo de Trabajo Mesa REDD+, national multistakeholder group convened by the Ministry of Environment
Peru	Red de Conservación Privada y Comunal para San Martin, network of NGOs and community organizations linked to conservation initiatives in the San Martin region
	Mesa REDD de San Martin, multi-stakeholder forum for discussion of REDD+ initiatives in the Region
	Mesa REDD de Madre de Dios, multi-stakeholder forum for discussion of REDD+ initiatives in the Region
	Comisiones Ambientales Regionales, multi-stakeholder forums led by the National Environmental Councils to aid in the discussion of environmental policy at the regional level

Country	Civil Society Networks
	Red de Áreas de Conservación Privada Amazonas, network of private protected areas in the Amazonas region
	Grupo REDD+ Peru, national working group on REDD+ issues, with civil society, public sector and private sector participation
	Red Muqui, network of national and local civil society organizations in areas affected bymining activities
Venezuela	Red de Aliados para la Sinergia en la Gestión Ambiental del Estado Lara, communication network for government and non-government environmentalists that work in the state of Lara
	Asociación de Productores Integrales del Páramo (Proinpa), producers network in Merida
	Colectivo Mano a Mano, informal coalition that pursues agroecology
	Red de Centros de Ciencia, Tecnología y Educación Ambiental (CCTEA), network of research, technology and environmental centers that is linked to the Education Ministry
	Red Social de Cooperación Andina, network of 12 organizations from Táchira, Mérida and Trujillo, promoted by Uniandes
	Red ARA, network of environmental organizations that work both at national and subnational levels
Regional Networks	Red de Fondos Ambientales de América Latina (REDLAC), network of environmental funds in Latin America
	Red Amazónica de Información SocioAmbiental Georferenciada (RAISG), network of environmental organizations generating, exchanging and disseminating maps and other geospatial data of the Amazon, with a focus on strengthening collective rights, social and environmental sustainability.
	Plataforma Climática Latinoamericana (PCL), network of researchers and NGOs working on on issues relating to climate change. It has over 25 members from across Latin America
	ARA – Amazon Regional Network, network of more than 50 NGOs, universities, private organizations and researchers in 7 countries of the Amazon Basin (Venezuela, Colombia, Ecuador, Peru, Bolivia, Brazil and Suriname). It aims to promote multi-stakeholder dialogue for sustainable development in Pan-Amazonia

Source: Consultation workshops and this analysis 2013-2014.
[1]LIDEMA is also considered a NGO
[2]CIDOB is also considered a national indigenous organization

Fostering networks and partnerships among different types of NGOs was noted as in important need in the consultation workshops as a means of confronting funding scarcity and increasing threats. The types of strategies identified in the consultation workshops included the following:

- Support technical training in strategic planning and fundraising
- Ensure minimum funding to support coordination
- Encourage multi-sectoral networks amongst stakeholders that act in a common territory/landscape
- Strengthen networks’ capacity to influence local and regional policies
- Foster networks for conservation planning that enable organizations (and their interventions) to integrate their efforts for ecosystem and species sustainable management
- Supporting hotspot-wide exchange of lessons learned and approaches

In some cases the changing funding landscape has already led some NGOs to work in partnerships, coalitions and alliances, especially in submitting projects with larger bids that have greater impact area by grouping efforts across shared ecosystems between countries. For example, the regional project "*Comunidades de los Páramos*" coordinated by IUCN-Sur aims to integrate interventions in Colombia, Ecuador and Peru by working with three national NGOs under similar conceptual and methodological frameworks. CONDESAN, the *Consorcio para el Desarrollo Sostenible de la Ecoregión Andina*, is another organization that focuses on integrating sustainable management of natural resources with overcoming poverty and social exclusion in the Andes. Towards this end it has been able to bring together a number of partners from aid agencies, universities and NGOs. A number of networks working throughout Latin America are important to note, such as the Latin American Environmental Funds Network (REDLAC), the Climate Change Platform (PCL) and the Regional Amazon Network (ARA). These networks were not part of the institutional capacity assessment, as the exercise focused on national networks.

Sharing approaches and methodologies to address common threats such as extractive industries can be an important and potentially cost-effective tool. Currently, there is no network of environmental organizations that acts as a learning hub in extractive industries (*i.e.* mining and petroleum) in the hotspot.

7.6 Capacity of Civil Society Organizations

Many national NGOs have a long history of work with significant technical capacity and knowledge of the political and institutional context. There is also a growing number of active subnational organizations, paralleling a similar expansion of public-sector decentralization.

Baseline information on the strengths and weaknesses of the civil society sector in the hotspot was obtained through an assessment carried out by the profiling team, interviews with civil society representatives, and responses by participants in national stakeholder workshop to an exercise on this topic. This information was compiled by grouping civil society organizations into six categories (international, national, subnational NGOs; university and research centers; social, community-based and indigenous organizations, and producers' or private sector organizations).

Results show institutional capacity unevenly distributed among international, national, subnational non- governmental organizations (NGOs). Over 84 percent of international NGOs (of 25 total) were considered to have "very good" institutional capacity, with solid technical and financial resources (Table 7.9). Of national NGOs (57 total) just 67 percent were assessed as having "very good" capacity. For subnational NGOs (50 total), the fraction having "very good" capacity drops to 46 percent. This indicates an important area for potential support since subnational NGOs are the organizations that are generally most directly in contact with local stakeholders and closer to conservation challenges on the ground. Improved technical and managerial skills could significantly increase their conservation impact.

Table 7.9. Institutional Capacity of NGOs in Hotspot Countries (excluding community-based and indigenous organizations)

Type of NGO	Number of organizations	Have sufficient human resources			Have sufficient financial resources			Institutional Capacity Very Good: 1, Good: 2, Limited: 3		
		Yes	Partial	No	Yes	Partial	No	1	2	3
International	26	25 (96%)	1 (4%)	0 (0%)	23 (88%)	3 (12%)	0 (0%)	22 (85%)	4 (15%)	0 (0%)
National	57	43 (75%)	14 (15%)	0 (0%)	25 (44%)	22 (39%)	10 (17%)	38 (67%)	19 (33%)	0 (0%)
Subnational	50	30 (60%)	10 (20%)	10 (20%)	9 (18%)	17 (34%)	24 (48%)	23 (46%)	27 (54%)	2 (4%)

Source: Consultation workshops and interviews 2013-2014

The results for community organizations (community, indigenous, grassroots) show that most do not have adequate human and financial resources (39 percent and 44 percent respectively). The lack of these resources results in reduced institutional capacity for these organizations (47 percent characterized as having good capacity, 44 percent as limited). Table 7.10 shows the results organized by country.

Table 7.10. Institutional Capacity of Community-based and Indigenous Organizations in the Hotspot

Country	Number of organizations	Have sufficient human resources			Have sufficient financial resources			Institutional Capacity Very Good: 1, Good: 2, Limited: 3		
		Yes	Partial	No	Yes	Partial	No	1	2	3
Argentina	6	1	2	3	2	2	2	0	4	2
Bolivia	10	1	0	9	1	0	11	0	3	9
Chile	1	0	1	0	0	1	0	0	1	0
Colombia	6	1	5	0	0	5	1	0	1	0
Ecuador	8	2	5	1	2	5	1	0	7	1
Peru	5	1	1	3	1	0	4	0	1	4
Venezuela	0	--	--	--	--	--	--	--	--	--
Total	**36**	**6**	**14**	**16**	**6**	**13**	**19**	**0**	**17**	**16**

Source: Consultation workshops and interviews 2013-2014.

A total of 52 universities and research centers were identified as active in biodiversity and conservation-related research and teaching in the countries of the hotspot. A common observation from workshops and interviews is that they have high-quality human resources but lack adequate funding, which reduces their institutional capacity. Table 7.11 details the findings by country.

Table 7.11. Institutional Capacity of Universities and Research Centers in Hotspot Countries

Country	Number	Have sufficient human resources			Have sufficient financial resources			Institutional Capacity Very Good: 1, Good: 2, Limited: 3		
		Yes	Partial	No	Yes	Partial	No	1	2	3
Argentina	5	2	2	1	1	1	3	0	5	0
Bolivia	6	6	0	0	1	1	4	3	3	0
Chile	2	2	0	0	2	0	0	1	1	0
Colombia	14	8	6	0	8	6	0	8	6	0
Ecuador	7	5	2	0	4	3	0	3	4	0
Peru	12	9	0	3	4	0	8	1	11	0
Venezuela	6	3	3	0	2	3	1	2	4	0
Total	**52**	**34**	**14**	**4**	**21**	**14**	**16**	**18**	**33**	**0**

Source: Consultation workshops and interviews 2013-2014

In addition to the universities and research centers assessed above, it is important to highlight the work of the Missouri Botanical Garden and the New York Botanical Garden. Both institutions have a long history of working in the hotspot countries and have made significant contributions to species and ecosystems knowledge thru their partnerships with local universities and research organizations. These however were not included in the assessment presented above.

Assessments of private sector associations indicated that the majority (75 percent of 41) have “good” or “very good” capacity. This, combined with the fact that these are key players in territorial development, points to the need for engagement with these organizations on conservation issues. Table 7.12 shows the results obtained for these types of associations. It should be noted that it was not possible to get information for these associations in Chile and Venezuela. Colombia stands out for its strong institutional capacity in the private sector with the *Federación Nacional de Ganaderos* (FEDEGAN) and the *Federación Nacional de Cafeteros de Colombia* (FEDECAFE), a former CEPF partner, as leaders.

Table 7.12. Institutional Capacity of Private Sector and Productive Associations Identified in Hotspot Countries

Private sector and productive associations										
		Have sufficient human resources			Have sufficient financial resources			Institutional Capacity Very Good: 1, Good: 2, Limited: 3		
Country	Number	Yes	Partial	No	Yes	Partial	No	1	2	3
Argentina	9	2	5	2	2	5	2	1	5	3
Bolivia	9	2	2	2	2	2	2	2	4	0
Chile	--	--	--	--	--	--	--	--	--	--
Colombia	8	5	3	0	5	3	0	5	3	0
Ecuador	6	2	3	1	2	3	1	2	3	1
Peru	9	6	2	1	4	4	1	1	5	3
Venezuela	--	--	--	--	--	--	--	--	--	--
Total	41	17	15	6	15	17	6	11	20	7

Source: Consultation workshops and interviews 2013-2014.

7.7 Major Findings and Recommendations

There is dramatic variation among NGOs in their technical and financial resources, especially between national and international organizations. International NGOs are by and large better funded and have better access to international donors given their range of action and networking ability. NGOs at the national level, although many of them have strong technical capacity and staff, struggle with financial stability and sustainability, with a clear impact on their work and strategies. This disparity in financial and fundraising capacity is a critical issue that was highlighted by national workshop participants. Organizations based at the regional or local level face additional challenges such as lack of adequate funding as well as sometimes limited technical and management capacities.

Building and/or strengthening networks and fostering partnerships between organizations at these different levels can be a key strategy to overcome these constraints. This would enable sharing of expertise and contribute to enriching the sectors' overall capacity to influence the policy and regulatory framework. The current competitive funding environment adds to fragmentation and competition for scarce resources, often resulting to duplication and superimposition of efforts, which lessen the possibility of lasting impacts.

As mentioned in Chapter 6, stronger governments are a key characteristic of the political and institutional scenario in the hotspot, and in this context the donor and NGO community needs to continue to strategically evaluate their roles in order to be effective. In contrast to previous decades, there is greater governmental capacity (across different sectoral programs, more technical staff for protected areas management) and an increase in public investment in biodiversity conservation and natural resources issues, shrinking the gap that environmental NGOs historically filled. Complementing governments' increased capability to implement environmental policies and programs, NGOs continue to play a strategic role in policy formulation, providing evidence and influencing the public agenda. However, for policy advocacy work NGOs must be mindful of national regulations, which in some countries restrict this type of activity.

To be effective in positioning biodiversity conservation as a crosscutting issue, NGOs need to acquire or augment a number of skills. In particular, given the economic development trends in the hotspot, it is evident that the NGO community needs to improve its skills to communicate and engage in effective dialogue with governments. These are particularly important at the subnational level where, as reiterated in the consultation workshops, NGOs have an ample space for building and influencing policy and regulatory frameworks. Subnational governments in many cases still have institutional weaknesses to carry out conservation policies effectively; hence work at this level is a potential niche.

8. SYNOPSIS OF CURRENT THREATS

8.1 Introduction

The concentration of human populations in the Andes increased tremendously in the 20th Century with the onset of intensive, mechanized crop production, extensive cattle ranching and human population growth. These activities transformed a large part of the natural vegetation of the inter-Andean valleys, adjacent slopes and high plateaus, causing losses in biological richness, especially in the northern Andes (Corrales 2001, Wassenar *et al*. 2007, Rodriguez E. *et al*. 2012). Today, the central axis of the Pan-American Highway and much improved secondary roads provide relatively easy access to agriculture collection centers and processing plants, local and regional markets, and airports. As a result, the fertile agricultural soils of the Ecuadorian and Colombian Andes (and northern Peru to some extent) are covered by a patchwork of small to industrial-sized commercial pasturelands for dairy cattle and crops for domestic consumption (*e.g.,* potatoes, other tubers, wheat, barley, corn, legumes and fruits) and for export (*e.g.,* broccoli, artichokes, quinoa, avocados, cut flowers, coffee and cocoa.)

Large-scale landscape transformations are readily apparent and well-documented by remotely-sensed imagery, as is the location of remaining Andean forests, potential corridors and other high conservation value vegetation types, some under protection and others not. Some human alteration of Andean habitats, however, has been less drastic and harder to recognize, for example, the extraction of commercial timber or non-timber species from montane forests or the degradation of páramo habitat due to inappropriate land use including over-grazing, intensive cultivation and pine plantations. These human activities have been shown to negatively affect the natural water flow regime in Andean regions (Buytaert *et al.* 2006).

Protected areas are the single-most effective way to save the largest number of species, habitats, and ecological interactions and processes (Olson 2010) and experience indicates that financial support for improved park management corresponds with increased ability to protect biodiversity, especially in the tropics (Bruner *et al.* 2001). Today, all of the Andean nations have well-developed national protected area networks (see Tables 4.12a and 4.12b) that aim to conserve intact tracts of native forests and other natural vegetation types and the ecosystem services they provide, and to protect biodiversity. Government funding for protected areas management is on the rise in many countries (Chapter 10). However, there are still significant gaps in the representation of numerous ecosystems in the protected areas. An analysis of the gaps in protection of tropical Andean ecosystems revealed that of 133 unique ecosystem types, 59 percent have less than 10 percent of their area protected (Josse *et al*. 2009). Major gaps are for dry seasonal forests and dry shrublands of mid elevations, mostly located in the inter-Andean valleys.

Some KBAs in all hotspot countries are protected areas (Appendix 5). Many of these protected areas are, however, under threat due to a combination of (1) changes in human demographics (within-country regional migrations to buffer zone areas), (2) increased pressure for natural resources, (3) boundary and land tenure conflicts, (4) habitat degradation outside of protected areas, (5) insufficient funding for adequate management and (6) changing climate (Armenteras and Gast 2003). The Conservation Outcomes chapter presents a section where the legal protection status of KBAs is further discussed.

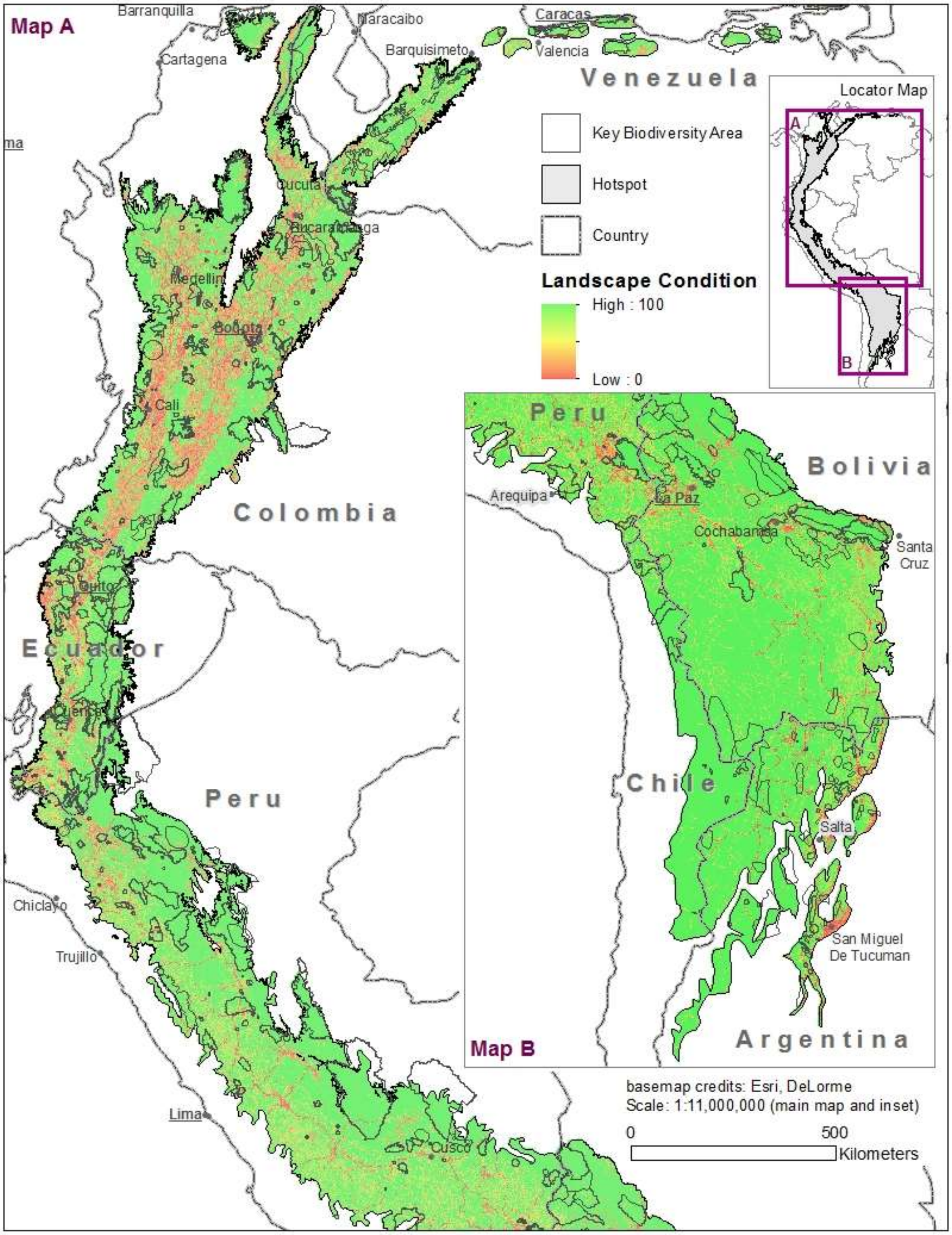
In response to limited funding to support the administration and management of national protected area systems (see Chapter 10), in some Andean countries new protected areas are being established to be managed at local and regional levels or directly by municipal governments, civil society organizations, private landowners, local communities or indigenous peoples. A number of these sub-national and privately managed protected areas are located in the hotspot and some are associated with KBAs. For example, a network of private protected areas is part of the Serrania de Paraguas KBA in Colombia. The Villa Carmen Reserve, managed by the Amazon Conservation Association, is within the Kosnipata Carabaya KBA in Peru. Several conservation areas administered by municipal governments, communities and private citizens are located within the Maquipucuna-Río Guayllabamba, Mindo and Los Bancos-Milpe KBAs in northwestern Pichincha Province, Ecuador. In addition, new financial mechanisms are in place to keep natural forests standing and protect páramos and other natural ecosystems in several countries, as explained in Chapters 6 and 10.

8.2 Quantification and Qualification of Threats

The Tropical Andes are witness to myriad threats to biodiversity that come from numerous sources (Jarvis *et al*. 2010). To quantify the threats facing the KBAs, each site was scored for vulnerability using a scoring system derived from a Landscape Condition Model of the hotspot that accounted for current (2007-2012, depending on the threat) agricultural land uses, grazing, highways and roads, electrical transmission lines, urban areas, gas and oil pipelines, and mines (methodological details in Appendix 3). This exercise allowed for a comparison among all KBAs of the degree to which each is experiencing activities that can be incompatible with conservation. Some of the threats to KBAs were not reflected in inputs to the vulnerability analysis because they are spatially restricted (*e.g.*, selective logging or artisanal gold mining) or have not yet materialized (*e.g.*, planned infrastructure, mining concessions that are not yet under production, or resource use policies). Each stressor is discussed in detail subsequently in this chapter. The model results are depicted in 90 m pixels across the entire hotspot (Figure 8.1) and also averaged across KBAs and corridors (Figures 8.2 and 8.3) to allow comparison as these spatial scales.

Across the region, the model shows comparatively high levels of threat in the northern Andes (Venezuela, Colombia and Ecuador) as compared with Peru, Bolivia and Argentina (Figure 8.1). This result is largely driven by the fertile inter-Andean valleys between the cordilleras of the northern Andes that have been converted to agricultural uses and population centers. Population density is high in these valleys, especially in Colombia and Ecuador, where forest remnants remain only at higher elevations or on inaccessible slopes. In contrast, in the Peruvian and Bolivian Andes, large forested areas are still found on the eastern slopes and the vast highlands are covered by extensive puna grasslands and rugged peaks. Agriculture and grazing does occur on the puna but not at the same scale and intensity as in the northern Andes. Mining at high elevations – from Peru to northern Chile and Argentina – is, however, often intensive and associated with large negative social and environmental impacts (Chapter 5). Furthermore, recent improvements and the planned expansion of the road network that will crisscross the humid, forested, eastern slopes of Peru and Bolivia will likely result in conversion and fragmentation in unprotected areas and, in some cases, even in legally protected areas.

Figure 8.1. Landscape Condition of the Tropical Andes Hotspot (Baseline 2007-2012)



The comparative vulnerability of KBAs is shown in Figure 8.2. Several KBAs with high relative biodiversity value (defined in Chapter 4) also have high vulnerability. These KBAs are located along the Western Cordillera in Colombia and northern Ecuador, in the Central Cordillera of Colombia, and in the border area between Colombia and Ecuador at the eastern edge of the hotspot. Causes for their vulnerability are agriculture and grazing activity, roads and proximity to urban areas. Most KBAs, though, have low vulnerability. These results reflect in part the tendency to delineate KBAs to include natural cover to the extent possible and to coincide with protected areas. This result does not mean that they are not subject to stressors, but that current land uses and infrastructure have relatively lower impact on them than on other KBAs where more significant land use transformation is taking place.

This same pattern of higher vulnerability in the northern portion of the hotspot is reflected in the corridor-wide vulnerability analysis, which averages stressors throughout corridors both within and outside of KBAs (Figure 8.3). The high vulnerability of corridors located in the Central and Eastern Cordilleras of Colombia and the Northwestern Pichincha Corridor in Ecuador is due to their proximity to large cities and dense human habitation. Conversely, the moderate vulnerability of corridors in the Western Cordillera of Colombia and in central Ecuador is largely caused by the rural, agricultural landscapes that dominate these areas. Low vulnerability corridors still can have high localized threats caused by numerous factors.

Figure 8.2. Vulnerability of the KBAs of the Tropical Andes Hotspot

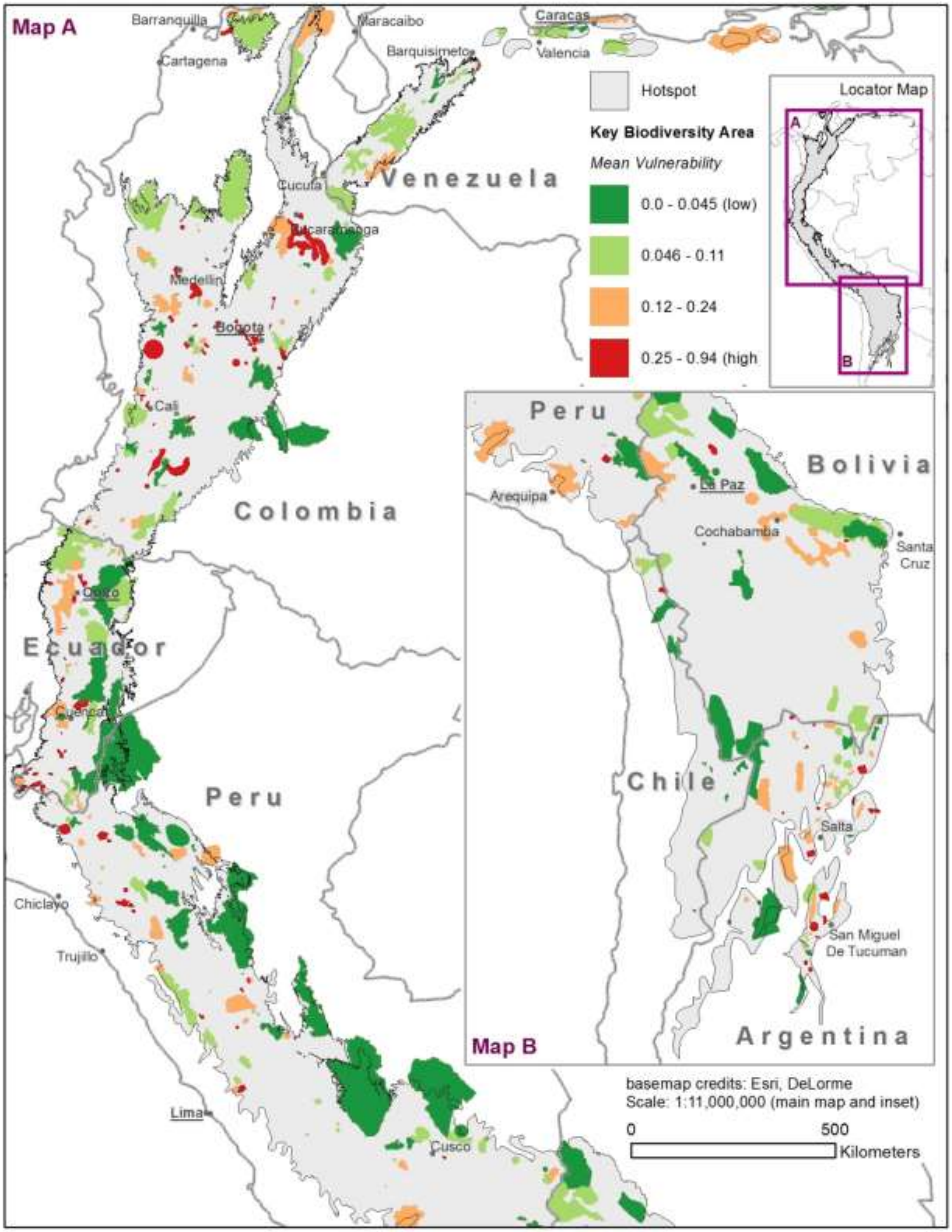
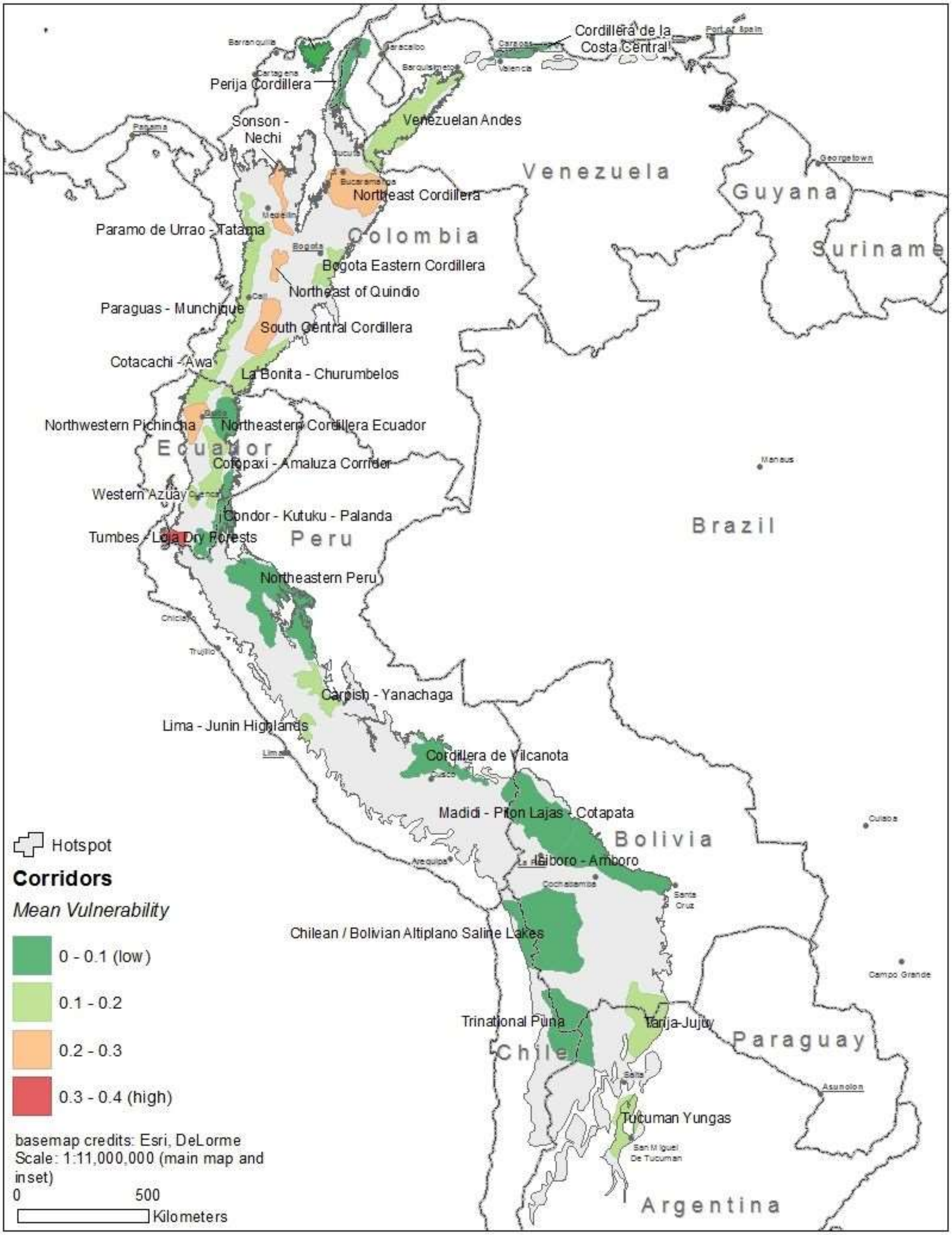


Figure 8.3. Vulnerability of the Corridors of the Tropical Andes Hotspot



8.3 Frequency of Threats to Regions, Corridors and KBAs

During the seven national consultation workshops, threats to biodiversity were identified for specific regions (*e.g.*, Western Cordillera, Eastern Cordillera of Colombia), potential conservation corridors (*e.g.*, Condor-Kutuku-Palanda Corridor in southeastern Ecuador, Cordillera de Vilconota in Peru) and some KBAs (*e.g.*, Sierra Nevada de Santa Marta National Natural Park and surrounding areas in Colombia). Each category of threat was assessed for its severity and frequency of occurrence. Table 8.1 presents a summary of those expert opinions regarding prevalence (which combines severity and frequency) of each category of threat in the hotspot. There was significant agreement of the relative prevalence of threats to biodiversity across the Tropical Andes. The predominant threats are mining, new road infrastructure, agriculture (includes subsistence and commercial but not industrial), grazing and deforestation (which is usually a direct result of the other threats). Differences, especially the relative importance of specific threats, among hotspot countries are also apparent. Only in Bolivia and Ecuador was illegal hunting and species trafficking mentioned as a threat, for example, and insecurity and violence was frequently cited as a threat in Venezuela, Colombia and to a lesser extent Bolivia.

Table 8.1. Prevalence of Threats in KBAs and Corridors by Country

Threat Category	Prevalence in KBAs and Corridors							Relative importance of threat in KBAs across the Hotspot[1]
	Argentina	Bolivia	Chile	Colombia	Ecuador	Peru	Venezuela	
Deforestation	xx	xxxx	--	xx	xxx	xx	xx	15
Human colonization	--	xxxx	--	x	x	xx	x	9
Expansion of urban areas	xxx	--	--	xxx	xx	xx	x	11
Illegal land occupancy and insecure land rights	x	xx	--	xxx	x	x	x	9
Advancing agriculture (annual and tree crops)	x	xxx	--	xx	xxxx	xxx	x	14
Industrial agriculture	xx	--	--	x	--	--	--	3
Grazing animals	xx	xx	x	xxx	xxxx	x	xx	15
Mining	xxx	xxxxx	xxx	xxxxx	xxx	xxxxx	--	24
Hydrocarbons	xx	xx		xx	--	x	--	7
New road infrastructure	xxxx	xxxxx	x	xxxxx	xxxx	xxxx	x	23
Other infrastructure (*e.g.*, dams, geothermal)	x	xx	--	xx	xx	xxxx	--	11
Illegal crops (coca, poppies)	--	xxx	--	xx	--	xx	--	7
Illegal hunting and trafficking	--	xx	--	--	x	--	--	3

Threat Category	Prevalence in KBAs and Corridors							Relative importance of threat in KBAs across the Hotspot[1]
	Argentina	Bolivia	Chile	Colombia	Ecuador	Peru	Venezuela	
flora or fauna								
Illegal Logging	x	x	--	--	x	x	--	4
Firewood collection	--	x	--	--	--	--	--	4
Unorganized or expanding tourism	x	x	--	xxx	--	x	x	7
Insecurity and violence	--	x	--	xxx	--	--	xxx	7
Other threats[2]	--	xx	x	x	x	--	x	6

Source: National consultation workshops
[1] Determined by summing the seven country-wide threat assessments.
[2] Other threats: conflicts with fauna (*e.g.,* puma, bear), conflicting use of water, irrational use of a specific resource, invasive species and forest fires.

These results indicate that, according to the perception of local experts, the most important threats to KBAs and corridors across the hotspot are mining and new road infrastructure, followed by deforestation, grazing and advancing agriculture (Table 8.1). New road infrastructure and grazing animals were the only specific threats that were cited at all of the seven national workshops, and mining was mentioned as a threat in all hotspot countries except Venezuela. Expanding urban areas, public works infrastructure other than roads, human occupation and illegal land occupancy were moderately important threats across the hotspot. The threat of insecurity and violence in KBAs/corridors was important three countries (Bolivia, Colombia and Venezuela) as were illegal crops (Bolivia, Colombia and Peru). Threats of hydrocarbons and unorganized or expanding tourism were as important as insecurity and illegal crops. The threats that were least frequently cited by experts at national workshops were: illegal logging, firewood collection, illegal hunting and trafficking flora or fauna, industrial agriculture and the grouped category of other threats.

8.4 Assessment of Principal Threats in the Hotspot

Deforestation

A recent global analysis of tree cover loss/gain for the period 2001-2012, based on satellite imagery, was carried out by Hansen *et al*. (2013). Their country-wide results for the Tropical Andean Hotspot are presented in Table 8.2. and indicate that comparatively for the hotspot region, Peru (0.17 percent), Venezuela (0.18 percent), Ecuador (0.22 percent) and Colombia (0.25 percent) had lower average annual rates of forest cover loss between 2001-2012 whereas Chile (0.51 percent) and Argentina (0.92 percent) had relatively high average annual rates of forest loss during that eleven-year period. It should be noted that each hotspot country also experienced gains in forest cover during this time period but that forest losses exceeded forest gains. Forest gains corresponded to areas of regenerated forest or tree plantations that are generally less important for biodiversity conservation – especially threatened, endemic or restricted-range species – than natural forest.

In some hotspot countries, official deforestation rates – calculated for the whole country and in some cases, by region– have been made public only recently and are usually somewhat different from those shown in Table 8.3 due to methodological differences.

Table 8.2. Forest Cover and Annual Deforestation Rates in Hotspot Countries, 2001-2012

Indicator	Country[1]						
	Argentina	Bolivia	Chile	Colombia	Ecuador	Peru	Venezuela
Forest cover[2] 2001 (thousands of ha)	39,994	64,863	19,514	82,218	19,188	78,149	56,992
Forest cover 2012 (thousands of ha)	35,952	62,064	18,410	79,960	18,714	76,713	55,890
Forest loss 2001-2012 (thousands of ha)	4,042	2,799	1,104	2,258	474	1,436	1,102
Annual deforestation rate 2001-2012 (%)	0.92	0.39	0.51	0.25	0.22	0.17	0.18

Source: Global Forest Watch 2014
[1]Data are for the whole country and not restricted to the hotspot area.
[2]Defined as greater than 25% canopy cover density.

Focusing on deforestation with the hotspot, much of the region suffered major habitat losses centuries ago, including in pre-Columbian times. More recent human population pressures, commercial farming activities, extractive industries, improved road access and other infrastructure development have caused the loss or degradation of much of the remaining Andean habitat. According to a map of Andean ecosystems from Venezuela to Bolivia (Josse *et al.* 2009), remaining natural vegetation covers 77 percent of the region as either intact or regenerating forest (36 percent) or other systems (grasslands, shrublands, dry scrub, bare soil or snow; 41 percent). Converted land covers 23 percent of the region. These figures are approximate, though, because some activities such as selective logging or grassland degradation are difficult to map accurately.

Recently, numerous contributors joined efforts to publish an integral assessment of the pressures affecting Amazon forests (RAISG 2012). The area of this assessment included the eastern slopes of the Andes. A similar comprehensive account of pressures and threats does not exist for the remainder of the tropical Andes region nor has a comprehensive regional approach been used to assess deforestation patterns in Andean forests, as has been done for Amazonian forests.

Individually, most countries in the hotspot have developed deforestation models that estimate recent forest cover change rates on a national or sub-national scale. According to the Ministry of Environment of Ecuador (2011), for example, the annual rate of net forest loss in Ecuador was 0.63 percent (61,800 hectares per year) during 2000-2008. Sierra (2013) used those data for subsequent analysis of net projected deforestation for the period 2008-2018 across broad subnational ecoregions. This study predicted drastic reductions in net forest loss due to a decrease in forest loss and an increase in forest regeneration. According to this analysis, the Andean highlands is expected to incur greatest net forest loss (8,676 ha/year) compared to the coastal plain where a slight gain in net forest cover is expected (53 ha/year) and the Amazon basin, which is expected to lose 6,248 ha/year of forest cover.

To compare disparate deforestation data from multiple Andean montane forests and countries, Tejedor Garavito *et al.* (2012) compiled summary data of deforestation rates published by different sources using diverse methods (*e.g.*, analyses of aerial photography, Landsat imagery and maps) over different time periods (Table 8.3). Relevant results from two other recent studies consulted (FAN 2012, Rodriguez *et al.* 2012) are also included in this table. Reported annual deforestation rates ranged from a low of 0.32 percent in the Argentine Yungas to 3.6 percent in an unnamed watershed in the Venezuelan Andes. Most annual deforestation rates were in the 0.5 to 0.8 percent range. To provide perspective, with a constant 0.32 percent deforestation rate, the remaining forest will be completely destroyed in 312 years. The same forest would only last 28 years at a 3.6 percent deforestation rate.

Table 8.3. Deforestation Rates of Andean Forests

Country	Annual deforestation rate (%)	Assessment area	Period	Reference
Argentina	0.32	Yungas	1998 - 2002	Montenegro *et al.* 2005
Bolivia	0.70	Yungas	2000-2010	FAN 2012
Colombia	0.63	Montane forest	1985 - 2005	Armenteras *et al.* 2011
	0.83	Andean forest	1985 - 2000	Rodriguez *et al.* 2012
	0.54	Andean forest	2000-2005	Cabrera & Ramírez 2007
Ecuador	0.6 – 0.9	Podocarpus National Park (Loja and Zamora-Chinchipe Provinces)	1985 - 2001	Goerner *et al.* 2007
Peru	0.5 – 1	Andean forest	1990 - 1997	Achard *et al.* 2002
Venezuela	0.8 – 3.6	Several Andean watersheds	1967 - 1997	Hernández & Pozzobon 2002

It is difficult to compare national and Andean deforestation rates (Tables 8.2 and 8.3) because data were recorded for different time periods (national deforestation data covers 2001-2012 and Andean deforestation rates cover earlier periods). Andes-specific annual deforestation rates from the 2000s were only reported for Bolivia (FAN 2012) where they were nearly twice as high as national rates: Bolivian Yungas 7.0 percent (2000-2010) compared to Bolivia national deforestation 3.9 percent (2001-2012). Argentina was the only hotspot country in which its Andean deforestation rate (Yungas: 0.32 percent annually during 1998-2002) was lower than the national deforestation rate (0.92 percent annually during 2001-2012) although time periods of data collection were different.

Forest gains were documented in few Andean countries. In Colombia, gains of secondary forests were concentrated around the lower part of the Colombian massif (Central Cordillera), northern Antioquia (Central and Western Cordillera) and upper elevations of the Eastern Cordillera. Generally, gains in forest cover were associated with forest recovery following emigration from areas of continuous selective logging (Rodríguez *et al*. 2012).

In Bolivia, a comparison of deforestation and regeneration rates over two time periods (1990-2000 and 2000-2010) indicated a net loss of forest cover during both periods but with differences in regeneration rates. During 1990-2000, regenerating second growth forest was equivalent to 7 percent of the deforested area but increased to 35 percent of the deforested area during 2000-2010 (SERNAP 2013). Results of this study indicated that areas that had undergone high levels of deforestation during the first period exhibited relatively high regeneration rates later. Both Cochabamba and La Paz Departments, which include several KBAs (including the biological priorities Bosque de Polylepis de Taquesi, Cotapata, Alto Carrasco and surrounding areas, and Cristal Mayu y Alrededores), followed that pattern of regeneration but high levels of deforestation continued during 2000-2010 in Cochabamba while deforestation decreased in La Paz.

A continental-scale (Latin America and the Caribbean) study on deforestation and reforestation from 2001 to 2010 found that relatively large gains of woody vegetation occurred in the Andes of Venezuela, Colombia, Ecuador and Peru, and stated that most of this recovery occurred without active intervention. This result suggests that forestry plantations contributed little to the gain in woody vegetation over that period (Aide *et al*. 2013).

Looking ahead, three new web-based tools are available or under development to monitor future deforestation.

- Terra-i (www.terra-i.org) detects land-cover changes resulting from human activities in near real-time, producing updates every 16 days.
- Global Forest Watch (www.globalforestwatch.org) provides a visualization interface to annual deforestation analyses described by Hansen *et al*. (2013).
- The Biodiversity Indicator Dashboard will also provide visualization of the Hansen *et al.* (2013) data at regional, national and watershed scales. In addition, it will also include indicator data for biodiversity status (national Red List Indices), ecosystem services (water provisioning) and conservation responses (percentage of KBAs that are legally protected). A prototype using disaggregated global data is now available (dashboarddev.natureserve.org).

Linking Deforestation Threat to KBAs and Corridors

A recently-developed model used deforestation trends and their correlation with environmental, physical and anthropogenic features of the landscape to estimate future deforestation on the eastern slopes of the Tropical Andes (Josse *et al*. 2013). This model is distinct from the Landscape Condition Model used for vulnerability measures (Figures 8.1 and 8.2), which used measured, not projected threats. Projected deforestation rates were highest between 600-1,200 m elevation. This result is consistent with the current pattern of deforestation in the Tropical Andes where “deforestation hotspots” occur along the Andean-Amazonian transition zone and in the Orinoco watershed in Colombia (Tovar *et al.* 2010, Rodríguez *et al*. 2012, SERNAP 2013). Correspondingly, KBAs located within that transitional elevation band are likely to be at higher risk for deforestation than those at higher elevations. This is of particular concern for biodiversity conservation because some of the most botanically diverse sites ever recorded have been found at 1000 m elevation on the eastern Andean slopes (Gentry 1982, 1995).

The deforestation projections generated by the model are important for several specific KBAs in the hotspot, especially those along the eastern slopes of the Andes from Colombia to Bolivia. Projected deforestation values were high for both northeastern and southeastern portion of the hotspot in Ecuador, including the KBAs Sumaco-Napo Galeras, Antisana, Llanganates and Podocarpus National Parks, Abra de Zamora and the Cordillera del Condor. The latter two KBAs have projected deforestation values similar to those of Madre de Dios Department in southeastern Peru, where illegal mining has led to a threefold increase in deforestation between the periods 2000-2005 and 2008-2010 (Asner *et al*. 2013).

Deforestation for the large area surrounding the Cordillera de Colán and Abra Patricia-Alto Mayo KBAs in Peru is predicted to be high at lower elevations. To the south, lower deforestation rates were predicted for the KBAs and corridors in central and eastern Peru. The KBAs in the Madidi-Pilón Lajas -Cotapata Corridor between Peru and Bolivia were projected to have relatively lower deforestation on upper slopes than at lower elevations. The model, which considers correlates of deforestation and not specific proposed development projects, also projects relatively high deforestation in the Alto Carrasco and surrounding KBAs and the Pilón Isiboro-Amboro Corridor in Bolivia. This latter projection is consistent with the high deforestation rates observed between 1990 and 2010 in KBAs corresponding to the Apolobamba Integrated Management Natural Area and Pilón Lajas Biosphere Reserve and Communal Lands (FAN 2012, SERNAP 2013).

Agriculture Expansion

Colonist and indigenous farmers who clear forest to create pastures and plant subsistence or cash crops are a small-scale threat that grows when multiplied by their large numbers. Until the 1990s, most crop yield improvements across the Andean highlands depended on expanding the area under production. The diversification of crop production and improved management techniques including the adoption of agroforestry and silvopastoral systems that reduce the need for larger clearings has alleviated some pressure of expanding agriculture and cattle grazing. Recent data regarding trends in agricultural expansion are variable for the hotspot.

A study in Ecuador for the twenty-year period 1990-2010 showed that agricultural production increased continuously without a significant increase of land area through improved management practices and the use of fertilizers and irrigation (Sierra 2013).

In the Colombian Andes, the two land cover categories that increased from 1985 to 2000 were crops (3.3 percent) and secondary vegetation (4.3 percent). The area of pastures decreased slightly during this time, but pasture was still the dominant land use in the region (Rodriguez *et al.* 2012).

In Peru, an assessment of the Yungas ecoregion showed that 1,452,955 ha of humid montane forest, or 9.65 percent of the ecoregion had been deforested historically due to agricultural expansion with 38 percent of this area located in the Cordillera de Colán and Abra Patricia-Alto Mayo KBAs (Tovar *et al.* 2010). Land use change data generated by the Conservation International REDD+ project estimated that 1.6 million ha of forest were lost in San Martin Department where these KBAs are located. More than half of the deforestation was for small-scale agriculture, 30 percent due to mid-scale agriculture and 15 percent due to cattle ranching (Conservation International 2013).

In Bolivia, most of the deforestation in the tropical Andes is due to the expansion of livestock grazing and small-scale agriculture, with growth related primarily to the proximity of local markets (FAN 2012). Deforestation due to expanding agriculture affects KBAs overlapping the Carrasco (2.31 percent annual deforestation from 2000-2010) and Pilón-Lajas (0.24 percent) protected areas. The rate of deforestation is declining at Carrasco but increasing at Pilón-Lajas. In contrast, the Madidi protected area has experienced low deforestation (0.01 percent), and this rate is declining (FAN 2012). It is likely that this situation will change in the near future as the World Bank-funded road and airport infrastructure project in Rurrenabaque, aimed to support tourism growth in Madidi National Park, comes to fruition.

Present deforestation trends in the Tropical Andes Hotspot can be summarized as follows:

- Higher net deforestation in the hotspot compared to national rates, which is worrisome because the forested area in the Andes is smaller than in the lowlands in Venezuela, Colombia, Ecuador, Peru and Bolivia;
- Deforestation is more pronounced at lower elevations of the hotspot in the Andes-Amazon transition zone compared to the highlands, reflecting new colonization in previously forested land of high conservation value (including biodiversity, cultural diversity and ecosystem services) where numerous KBAs are located;
- Much deforestation is caused by the expansion of pasture for livestock and small- and medium-scale agriculture;
- Regeneration is leading to an increase in the area of secondary forest landscapes.

Population Pressure and Migration

Population pressure and migration are deforestation drivers caused by the increasing need for new and greater areas for agricultural production and an increasing demand for food, water and energy by large populations in distant urban centers as well as in Amazonian communities. As was emphasized in Chapters 5 and 6, rural to urban migration has been and continues to be the dominant trend in the hotspot. Large migrations to towns and cities are due to shifting economic trends, employment and education opportunities, and infrastructure, housing and urban development, all leading to higher standards of living. Human concentrations in urban areas and associated infrastructure, while occupying smaller percentages of land area than dispersed rural populations, have much wider impacts on the environment as they require increasing amounts of water, energy and natural resources from surrounding landscapes. In addition, urban residents and industry use terrestrial and aquatic ecosystems for waste disposal and create air pollution to a greater degree than in rural environments, with the exception of concentrations of mining operations. Urbanization usually accompanies social and economic development, but rapid urban growth strains the capacity of local, regional and national governments to provide even the most basic services such as water, electricity and sewage treatment.

New and improved road networks and hydroelectric projects often directly threaten important biodiversity areas in the hotspot. The improved and extended Southern Interoceanic Highway connects Atlantic and Pacific ports by crossing directly through the Cordillera de Vilcanota corridor in southern Peru. Mining has been in important incentive for migration that has resulted in deforestation, as best evidenced by the massive influx of migrants to Madre de Dios, Peru, to work in gold mines.

Migration of Andean farmers from agricultural to forested areas for conversion has also occurred and continues today, at a lower rate than to urban areas, but is an important conservation threat due to the resulting deforestation and overexploitation of natural resources. In Bolivia, a CEPF-funded deforestation monitoring study of the Pilón Lajas Biosphere Reserve and Madidi National Park found that colonization for new agricultural lands was facilitated by improved road infrastructure. This information was used to update the protected area's patrolling and protection plan to mitigate the expected environmental impacts produced through the road upgrading (CEPF 2011). Another example of migration from agricultural to forested or semi-forested areas was triggered by the recent (2012-present) witch's broom fungus blight in coffee plantations in Peru's San Martin Department. This disease outbreak forced some growers to seek new farming opportunities, almost always through forest conversion and increased threats to biodiversity in other rural areas (Rainforest Alliance 2014).

A similar migration pattern to forested areas for production of illicit crops is also a serious threat to Tropical Andes ecosystems. In stakeholder consultation workshops in Bolivia, Colombia and Peru, this threat was scored high compared to others (Table 8.1). Illegal coca cultivation is not only associated with deforestation and over hunting and fishing, but also with pollution of soils, rivers and streams with kerosene, sulfuric acid and other chemical inputs used for processing coca. In Colombia, Peru and Bolivia, coca crops are grown in KBAs in the Western Cordillera of Colombia, especially in the Nariño and Cauca Departments, and to a lesser extent the Chocó (UNODC 2013). In Peru, illicit crops have been partially responsible for deforestation in the San Martin Department, but are also important in the lower reaches of Cordillera de Vilcabamba KBA (Urubamba Valley) (Tovar *et al*. 2010). In Bolivia, a large part of the deforestation of the Carrasco National Park and the surrounding area known as the Chapare is due to coca cultivation.

Transportation Infrastructure

At the national level, some hotspot countries have recently made significant investments in road and river infrastructure in the hotspot area (particularly Bolivia, Ecuador and Peru), including the paving and widening of existing roads or the creation of new ones. As described in Chapter 6, IIRSA is a development plan to link South America's economies through new transportation, energy and telecommunications projects. IIRSA investments are expected to integrate highway networks, river ways, hydroelectric dams and telecommunications links throughout the continent − particularly remote, isolated regions − to allow greater trade among the region's countries and facilitate exports outside the region (Figure 6.1). In 2004, IIRSA contemplated 335 projects across the region and in 2013, 583 were projected, an increase close to 60 percent and with four times the original estimated investment (IIRSA 2014). Road improvement in the humid montane forests on the eastern slopes of Bolivia, Peru and Ecuador are expected to experience the most severe impacts on species conservation due to the high levels of endemism associated with cloud forests in this region that previously had few points of human entry. If environmental conditions are severely altered by road projects, extinction of some species may occur, especially those with restricted populations (Killeen 2007).

IIRSA implementation is well underway. Numerous road construction projects will have impacts on KBAs and corridors in the hotspot, as outlined in Table 6.7. In Ecuador, for example, the stretch of road that bisects Sangay National Park (within the Llanganates-Sangay Ecological Corridor) to provide direct connection between the western part of the country and the Amazon region has been completed. Other road sections under construction in high conservation value areas within the hotspot are the TIPNIS in Bolivia and sections of the Olmos-Marañón River-Saramiriza in Peru.

In 2011, the World Bank approved the National Roads and Airport Infrastructure Project (at a total cost of more than US$100 million) in northern La Paz Department of Bolivia to improve year-round transit on the San Buenaventura-Ixiamas road (Phase 1) and improve the safety, security and operational reliability of the Rurrenabaque Airport (Phase 2) (World Bank 2014). These infrastructure improvements will affect the Madidi National Park, covering nearly 19,000 km^2, which can be reached from Rurrenabaque by crossing the Beni River by passenger ferry to San Buenaventura. Though these two towns are located in the Amazon lowlands, the Madidi National Park also protects parts of the Bolivian Yungas and montane dry forests ecoregions that are within the Tropical Andes Hotspot. The expansion of transportation infrastructure in this region of high conservation value could be considered both an environmental threat as well as an opportunity for CEPF to influence through support to civil society. Currently, however, the project is delayed (Palsson 2014).

The priority project agenda for IIRSA/COSIPLAN includes waterways (*hidrovías*) as well as highway transportation infrastructure. Most of the proposed waterways are outside of the hotspot in the Amazon and Parana River basins, except for some upper Amazon areas of Ecuador. The Amazon Hub project agenda includes connections of coastal and Andean areas of Ecuador and Colombia with the Amazon, especially the commercial market of the city of Manaus, Brazil, through northern access routes on three waterways (Napo, Morona, Putumayo) that are presently navigable only for limited draft vessels (IIRSA 2012). It is envisioned that this project will have an important impact on the communities living in its area of influence, especially those with no other transportation alternative. However, making the three rivers navigable to ships year-round would require substantial dredging that would inevitably create severe impacts to aquatic habitats, including within numerous national parks and other protected areas located predominantly outside of the Tropical Andes Hotspot. The increased traffic on the rivers would also bring other pressures such as deforestation.

All of these highway and river projects are large in scope and aim to vastly improve transportation over long distances. Highway infrastructure through tropical forests generates important threats to species and habitat conservation beyond the greatest and most obvious threat of inevitable human colonization following road construction and improvements. Laurance *et al.* (2009) reviewed the principal ecological impacts of new roads in the tropics, and ProNaturaleza (2010) identified threats specific to these southern IIRSA projects as part of a CEPF-funded project. Specific threats that highways pose to biodiversity include:

- Entrance of colonists, hunters, miners, loggers and land speculators;
- Risk of invasion of protected areas and indigenous territories;
- Physical disturbances that degrade local soils hydrology , aquatic environments and provision of ecosystem services;
- Chemical and nutrient pollution;
- Road clearings that create edge effects that incur physical and biotic changes and increase intensity and frequency of forest fires;
- Barrier effects to faunal movements;

- Road-related mortality from vehicle road kill, elevated predation or human hunting that could contribute to local species extinctions;
- Invasions of exotic species resulting from road and colonization clearings;
- Loss of scenic beauty that affects tourist operations and income.

Furthermore, ProNaturaleza (2010) highlighted potential social threats in this region due to improved transportation infrastructure such as increased crime and prostitution, more land and natural resource conflicts, impacts on human non-contacted groups (outside of hotspot), and contagious disease due to new vectors and more humans living in marginal conditions. Despite these threats posed by transportation infrastructure, there are examples of successful efforts to lessen the threats of highways or to halt projects altogether, such as organizing opposition that halted plans to build the controversial Inambari hydroelectric dam, and mitigation of impacts of the construction of a road through the Vilcabamba-Amboró Conservation Corridor.

Dams for Hydroelectric Production and Irrigation

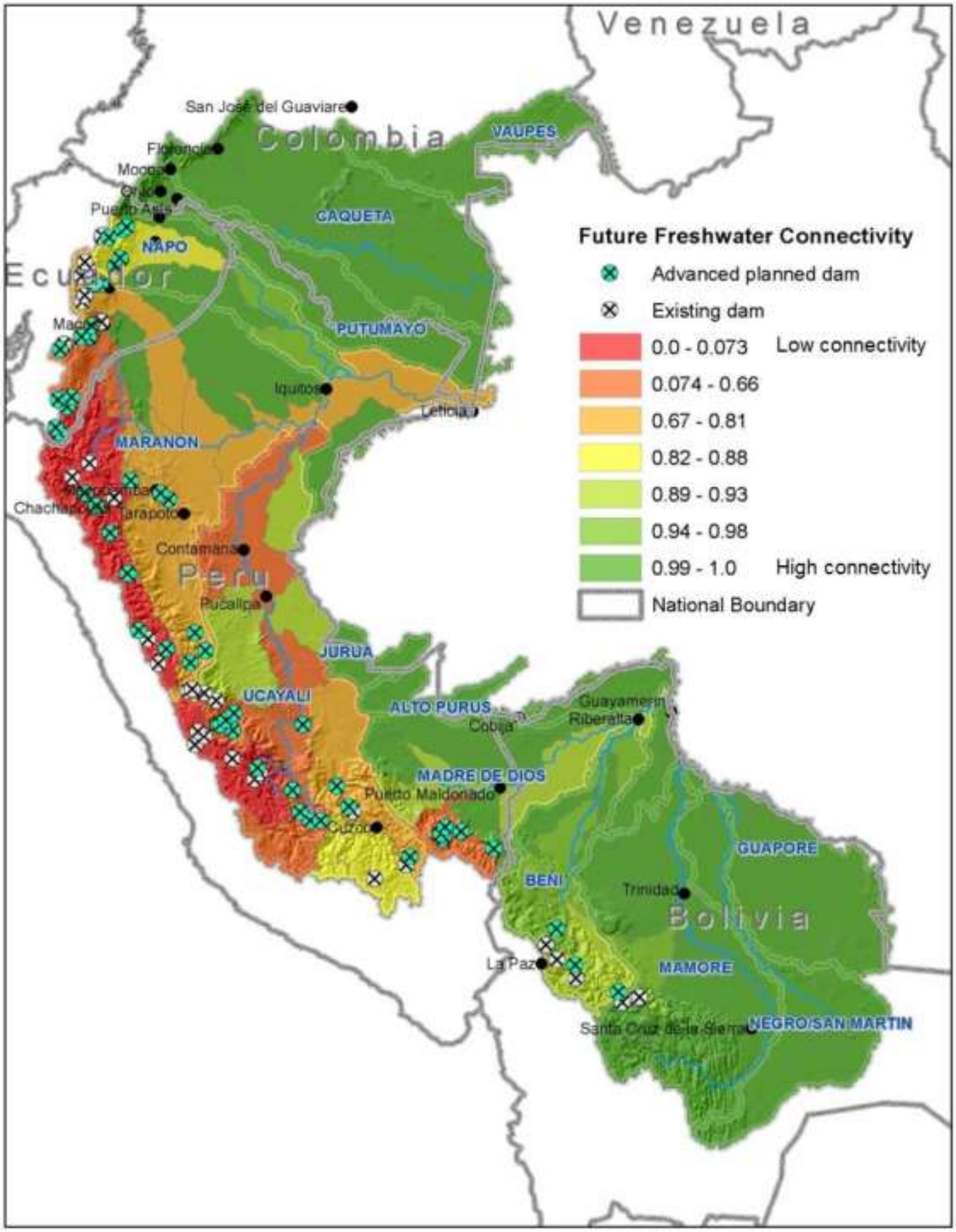
The energy sector – predominantly hydroelectric in the Andes – is a threat and an ally that includes both government actors and international companies. Due to rising energy demands and abundant untapped potential, the number of hydropower projects is rapidly increasing in the hotspot. This is especially true in the Andean-Amazonian countries, where regional governments are prioritizing new hydroelectric dams to satisfy energy needs (Finer and Jenkins 2012). Installation of new hydroelectric projects requires new roads and flooding, both of which lead to deforestation. As a partner for conservation, hydropower projects may serve as a link between water providers at the headwater and downstream water users. The plant itself may be both a non-consumptive water user and water regulator and provider. As water users, hydroelectric companies should support initiatives that provide compensation to upper watershed inhabitants to improve land use practices that protect the watershed. As a water regulator, the company can work with upstream providers and downstream users to ensure a reliable demand of quality water throughout the year.

Due to the abundance of water resources emanating from the Andes, it is not surprising that the countries comprising the Tropical Andes Hotspot depend heavily on dams for non-consumptive hydroelectric production and irrigation of catchment valleys. In a recent study focused on four hotspot countries from Colombia south to Bolivia, Finer and Jenkins (2012) collected data on hydroelectric dams and documented the potential cumulative impacts of existing and planned hydroelectric infrastructure on connectivity between Andean headwaters and lowland Amazon. They documented plans for the construction of 151 new dams over the next 20 years, each generating more than 2 MW of electricity, more than a 300 percent increase for the region. As each country assesses its own needs and investment plans for new hydroelectric infrastructure, there has been little or no regional assessment of potential ecological impacts on areas of high conservation value. This lack of strategic planning is particularly problematic given the intimate link between the Andes and Amazonian floodplain, together one of the most species rich areas on Earth (Finer and Jenkins 2012).

One way to look at the effects of dams on biodiversity is to examine how dams reduce the connectivity of freshwater systems. Figure 8.4 shows the results of such an analysis for 31 dams that are in place and 59 dams planned for the future on the Amazonian drainages of the Andes from southern Colombia to Bolivia (Josse *et al*. 2013). Freshwater connectivity was scored using a spatial model that calculated the cumulative effects of all dams within a nested stream network, weighting dam impact according to production capacity. The results show the highest impact of dams on freshwater connectivity in the high elevation watersheds of Ecuador and Peru. This loss of connectivity will primarily affect aquatic species such as fish and aquatic invertebrates. Dams cut off dispersal and therefore fragment populations, making them more vulnerable to local extirpation and inbreeding. Migratory aquatic species especially suffer because they are no longer able to complete migrations. Dams also alter natural regimes of river flow, changing aquatic habitats and causing them to be less suitable to native species. Upper watersheds in Bolivia are likely to be less impacted by dams than elsewhere in the area studied.

The freshwater connectivity analysis points to the following areas and KBAs that will be particularly affected by hydroelectric and irrigation projects: (a) watersheds of southeastern Ecuador including those in Podocarpus National Park and Cordillera del Condor KBAs, (b) KBAs in northeastern Ecuador, (c) Colán, Alto Mayo and Utcubamba watersheds and KBAs in northern Peru, (d) the upper basin of Ucayali that reaches some proposed conservation sites and corridors (*e.g.*, Kosnipata Carabaya, Ocobama-Cordillera de Vilcanota) in the Cuzco and Puno regions of Peru and (e) the Urubamba and Inambari watersheds in southeastern Peru. Dams in Amazonian watersheds interrupt the seasonal migrations of aquatic animals including the large catfish (*Brachyplatystoma rousseauxii* and *Pseudoplatystoma fasciatum*) that are important for food security in the region (Finer and Jenkins 2012).

Figure 8.4. Estimated Impacts from Existing and Planned Dams on Future Freshwater Connectivity Andean and Upper Amazon Watersheds in the Hotspot



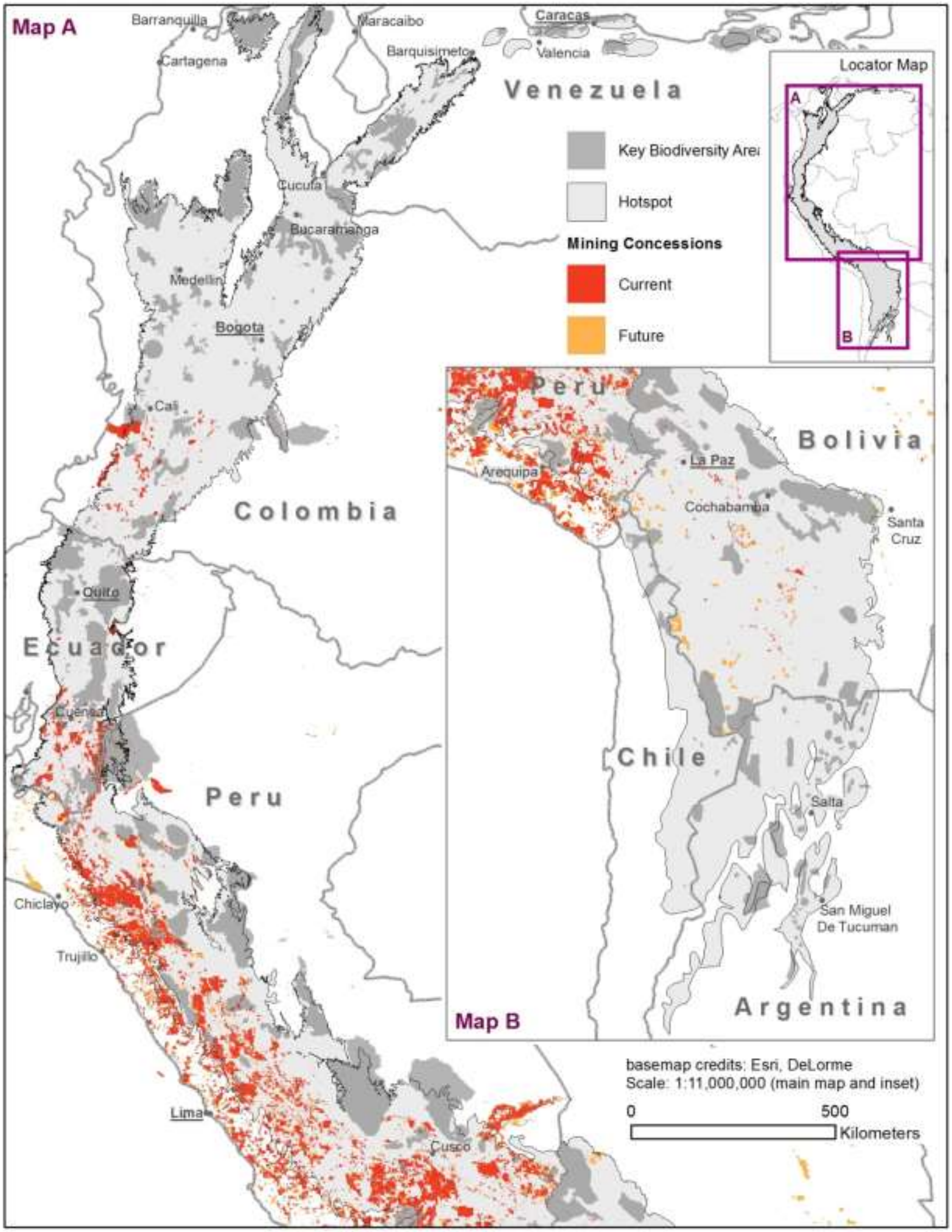
Source: Josse *et al*. 2013

Mining

As discussed in Chapter 5, mining for copper, gold, silver and other minerals affects large areas of the Tropical Andes Hotspot, particularly in Ecuador, Peru, Bolivia and Chile. This extractive activity that occurs both legally and illegally has a huge impact on habitat loss, degradation and contamination of soils and water courses. Figure 8.5 shows the location of current and future mining concessions based on official records of the sector. This figure overestimates the extent and density of current operations because mining operations have not started yet in many concessions but likely underestimates the true extent of small-scale illegal mining that is pervasive across the hotspot, especially from Colombia to Bolivia. Mining data for Venezuela, Chile and Argentina were not available.

At all of the national consultation workshops except Venezuela, mining was brought up as a significant conservation threat. In Chile and Argentina, where all mining is large- or mid-scale, threats are equally severe and difficult to address. In KBAs within the hotspot area of these two countries, the main environmental impact of mining is the use of large volumes of water which is a very scarce resource in the dry highlands where the mining occurs. The industry taps into underground aquifers causing hydrological changes of adjacent areas that often lead to drastic alterations of wetlands, a precious resource used by native fauna and domestic livestock alike. Another potential threat is mine tailing ponds or deposits that may leak toxic materials as often happens after an operation has ceased and leaves locals without any mitigation or chance for compensation. In many hotspot areas affected by industrial mining, local communities are demanding better environmental impact assessments and mitigation, greater transparency, improved practices and greater regulation and social responsibility by the industry.

Figure 8.5. Distribution of Mining Concessions in the Tropical Andes, Colombia to Bolivia



Source: Finer and Jenkins 2012.

Key actors in the mining sector are the private and public business operations involved in exploration and extraction of minerals and non-minerals (*e.g.*, road building materials), as well as the government agencies in charge of regulating them. In some hotspot countries, foreign companies dominate the mining landscape. In Ecuador, for example, companies owned and run by the Chinese government are major investors in mining activities. Unfortunately, these companies do not have good environmental records nor does it appear that environmental concerns are high priority in their new industrial endeavors in the hotspot. For this reason, it is of paramount importance to involve business leaders in discussions about conservation threats, mitigating actions and the potential negative impacts their operations are likely to have on biodiversity and environmental services. Due to greater regulation and scrutiny of social and environmental impacts, some businesses have begun to develop lines of corporate responsibility as an integral part of their corporate strategy and contemplate how to implement sustainable environmental practices. Determining which companies are truly committed to reducing their environmental impact and use independent verification of their actions (as, for example, Rio Tinto has at a Madagascar mine, Temple *et al*. 2012) will be important for identifying private sector partners to work with.

Associations or communities of small and medium-scale miners working concessions are also a threat. Small-scale activities usually take place near large-scale mining operations. Laborers tend to use low technology and have minimal machinery. They are likely to lack safety measures, health care or environmental protections. Small-scale miners can pollute waterways through mercury use, dam construction, siltation, poor sanitation and effluent dumped in rivers. Monitoring and enforcement of environmental regulations is hampered by informality, the remote location and lack of resources (Tarras-Wahlberg *et al*. 2001).

In Ecuador, mining is highly controversial and has vocal opposition. A new Mining Law is in progress and generating much discussion. Kincross, a Canadian mining company, left the country in 2013 due to a policy impasse with the Ecuadorian government. Ostensibly legal gold mining has been ongoing in the Intag Valley on the western slopes of the Andes where the Intag-Toisán KBA is, and currently there is a heated conflict due to the potential development of an open pit copper mine by the Chilean mining corporation Codelco. Gold mining at an artisanal level has occurred over decades in southern Ecuador, but today the scale of operations includes medium and large, internationally-funded industrial ventures as well.

The Peruvian government has a concession system for legal mining, especially gold. There are three types of mining that occur in Peru: (1) underground mining, (2) open pit mining and (3) dredge mining for alluvial gold deposits. All occur in the hotspot and chemical traces of mining, particularly heavy metals, have been found in downstream waters (see Chapter 5). Reports from the Carnegie Amazon Mercury Ecosystem Project (CAMEP 2013) on mercury levels in fish and humans tested in Madre de Dios, Peru, showed 90 percent increases from 2009 to 2012 in mercury concentrations in fish of different species and the average mercury concentration in people tested was 2.7 ppm, almost three times the reference value of 1ppm. Illegal gold mining has been practiced for decades on the eastern foothills of the Andes, especially in Madre de Dios, and its threat to this biodiverse region is increasing. Recently, for example, 800 police were called in to destroy a large amount of excavating equipment from the buffer zone of the

Tambopata National Reserve in Madre de Dios where extractive activities are prohibited (RPP Noticias 2014b). Tambopata is on the lower Amazonian boundary of the hotspot and most of the controversial and largely illegal alluvial mining in Madre de Dios occurs outside of the hotspot.

Over the last decade, legal and much more illegal gold mining has prospered in the fragile high Andean regions of the Titicaca basin and the Carabaya and Apolobamba mountain ranges near Puno, Peru affecting the following KBAs in Peru: Cordillera Carabaya, Sandia, Maruncunca and Titicaca Lake. Heavy machinery has caused massive destruction of highland wetlands and arsenic has been found in Titicaca Lake (Ráez 2013). The infamous Rinconada gold mine, at 4400 m elevation under the lip of a glacier, is the highest working mine in the world. There, human laborers search for veins of gold deep within the mountain in dangerous conditions. This lure of a financial jackpot attracts huge numbers of young male highland migrants from Andean cities.

Mining in Bolivia is a particularly severe threat to many Andean protected areas (national consultation workshop). Gold, silver, tin and lithium are mined in ecologically-sensitive areas. Demand for lithium is expected to increase due to the growing use of the element in cell phone and electric car batteries. The Bolivian Government has recently received technical support from the Netherlands to exploit lithium (Government of the Netherlands 2013). Much of the lithium mining activity occurs on the Uyuni salt flats, in conflict with the goals of public and private agencies to promote tourism in this scenic region that corresponds to the Chilean/Bolivian Altiplano Saline Lakes Corridor.

Over-exploitation of Species

Firewood taken from natural forests is an ecosystem service to those who depend on its availability for cooking and heat. In many remote rural areas of the Tropical Andes Hotspot (*e.g.*, on the altiplano of Peru and Bolivia), families still depend on firewood for cooking fuel, and its collection and use can have strong negative impacts on both the local environment due to overharvest of natural forests such as those of *Polylepis* as well as human health due to smoke and carbon monoxide production, especially among women and children. Cushion plants in the Chilean altiplano (*Azorella compacta*) are still the major source of fuel for the indigenous Lauca people. The species was formerly overexploited as a fuel source in the first half of the 20th Century for railroads and mines, but now appears to be recovering (Kleier and Rundel 2004). In urban areas, on the other hand, the use of pressurized natural gas is almost universal, leaving little market for firewood.

Logging in the hotspot is generally small-scale and most wood products are destined for local markets. Some exceptions include species of *Podocarpus*, the only native conifer in the tropical Andes that is commonly used for carpentry and furniture, including some well-crafted products for high-end domestic or export markets. Uncontrolled logging likely has a negative impact on certain timber species but in the hotspot, logging is not a major driver of deforestation when compared to agriculture.

Hunting and Illegal Trade

The growth of human populations has increased demand for some species and increased market prices for commercial species. Today, hunting for food is usually localized and not widespread in the hotspot, while hunting for illegal trade is much more common. A foremost example is the vicuña on the altiplano of southern Peru, Bolivia and northern Chile and Argentina. Poaching is problematic in all four countries and in the 1960-70s almost led to the species' extinction. Populations recovered through a combination of protection in national parks and a crack-down on the unregulated trade of vicuña wool, a strong soft fiber that is one of the most expensive in the world. In the early 1990s vicuña wool was de-regulated as initiatives developed to sustainably manage vicuna production. Andean governments such as Bolivia and Peru developed specific national regulations that encouraged partnerships between communities and authorities to ensure compliance of various international commitments regarding vicuña. Still, control is limited and poaching continues, for example it was reported recently that over 100 vicuñas were killed by poachers in the Andean region of Ayacucho, Peru (The Peruvian Times 2014).

A study on wildlife traffic and local wildlife use in the hotspot, carried out in the Amazonas and San Martin Departments of northern Peru (location of the Colán and Alto Mayo KBAs), indicated that parrots were the most frequently trafficked, followed by primates, but that half of the animals encountered had actually been hunted from Amazonian forests and were being transported across the Andes to the coast. Endangered species were mainly kept as tourist attractions in hotels or restaurants. Environmental authorities suffered from a lack of personnel, resources and rescue centers to house captured wild animals (Shanee 2012).

Examples of illegal trade of plant species from the hotspot include wild species of orchids, bromeliads and a rich variety of ornamental plants that grow naturally in Andean montane and upper Amazonian forests. Orchids are of particular interest on export markets and since 1981, all orchid species have been listed on CITES. Businesses based on the artificial propagation of Andean orchid species have been successful in the hotspot (*e.g., Ecuagenera* in Gualaceo, Ecuador) and such ventures could be an economic alternative to traditional agriculture in some hotspot countries and may also increase conservation interest of natural areas where orchids are found.

Another example of overexploitation and illegal commercialization of endangered plants from the hotspot is the traditional harvest of wax palm leaves (*Ceroxylon* spp.) to distribute to parishioners on Palm Sunday, the beginning of Holy Week. The geographic distribution of this slow-growing palm is 900-3500 m elevation in the Andes from Venezuela to Cochabamba, Bolivia (Montúfar G. 2010). In Ecuador, wax palms are legally protected and to deter their illegal harvest, the Ministry of the Environment has begun to encourage the use of other fibrous-leafed species, such as coconut palms and bamboos, as substitutes on this religious holiday (El Telégrafo 2014). Reaching 60 m in height, *Ceroxylon quindiuense* – one of Colombia's seven wax palm species – is the tallest palm in the world and is also the only known nesting habitat for the endangered Yellow-eared Parrot (*Ognorhynchus icterotis*). Thus, protection of natural forests dominated by the wax palm will also help protect this parrot species (El Diario 2014).

Invasive Species

Although exotic invasive species represent major threats that have caused many extinctions in island ecosystems, invasive species are a less widespread threat in the Tropical Andes. Exotic species are rare in the interior of intact forests, although exotic plants can invade along disturbance corridors such as roads or pipelines or in landslides or after deforestation (Kessler

1998, Killeen 2007). Introduced mammals rarely persist in native forests in the Tropical Andes (Ramírez-Chaves *et al*. 2011). Invasive species can be more important in grasslands and agricultural systems. Over centuries, cold-hardy European grass species were introduced to páramo and puna grasslands in the hotspot where they outcompeted native grass species due to their long evolution with hoofed domestic grazers, also introduced (*e.g.*, cows, horses, sheep, goats), thus facilitating expansion of cattle grazing over Andean landscapes. The European hare (*Lepus europaeus*) has spread north from where it was introduced in Argentina and Chile to reach southern Peru by 2002. Hares, which have been observed as high as 4,300 m in Peru, overgraze puna habitats and alter native vegetation (Zeballos *et al*. 2012). On the other hand, a major component of the diet of the Near Threatened Andean Condor can be hares and other introduced herbivores such as sheep and goats (Lambertucci et al. 2009). Many introduced insects are pests of agricultural crops or interrupt pollination systems. For example, several species of invasive potato tuber moths have become pests of potato farms throughout the hotspot (Dangles *et al*. 2008).

Invasive species can be more noxious in aquatic systems. As described in Chapter 3, introduced rainbow trout are blamed for the extinction of an endemic fish in Colombia. Rainbow trout occur as high as 3,000 m in the Andes (Barriga 2012) and are linked to declines of aquatic amphibians as well as fish (Ojasti 2001, Young *et al*. 2001). Perhaps the greatest threat posed by an invasive species in the hotspot is the amphibian disease chytridiomycosis, caused by a fungus. Although there is some debate about whether the fungus is exotic to the Andes, the disease is now widespread and has likely caused numerous extinctions and population declines, especially of frogs associated with mid-elevation streams (Collins *et al*. 2009). Chapter 4 discusses the disease and related strategic priorities in more detail.

Climate Change

This source of threat is discussed in detail in Chapter 9.

8.5 Strategies to Address Threats

Participants in the national stakeholder workshops suggested numerous strategies that civil society organizations can pursue to address the major threats to Andean species and ecosystems. Strategies for the major threats follow.

Mining

As described above, mining is a pervasive threat throughout the hotspot. First, multi-sectoral coordination is needed in the permitting process to prevent the siting of mines in areas of incompatible land use. Civil society organizations can promote policy changes to improve the permitting process at national and sub-national levels. These organizations can also work at the community level to require best practices by mining companies working within their jurisdictions. Examples of success are in Conga, Cajamarca, Peru and Imbabura, Ecuador.

Second, there is a major need for direct engagement with private sector mining companies. These efforts can be directed at mitigation and offsets, improving practices to reduce environmental contamination and better siting guidelines to reduce impacts on sensitive areas.

To address illegal mining, civil society organizations can help organize local communities to resolve this problem through negotiating with stakeholders, conflict resolution, land use planning, alternative production activities and improved mining practices. Successful community-level interventions have taken place in the Tumbes-Chocó-Magdalena Hotspot and can serve as models.

Infrastructure

Although many infrastructure projects bring demonstrable benefits to affected communities, not all do. For infrastructure with justifiable economic benefits, civil society can help support adequate mitigation measures, or to reroute projects away from biologically sensitive areas. Support for vigilance to prevent damage to protected areas accessed by roads (an activity CEPF has supported in the Vilcabamba-Amboro corridor) is another option. In addition, civil society organizations can monitor the impacts of infrastructure to guarantee that promised environmental mitigation measures are enacted and successful. Also important is to make sure that development project bring some benefits to conservation such broader opportunities for agroforestry and ecotourism-driven habitat protection with better transportation access.

Deforestation

As described in this chapter, numerous drivers can lead to deforestation. A cornerstone of conservation to prevent deforestation has been the establishment of protected areas. This strategy is still valid today. Although opportunities for national park creation may be limited in some countries due to political resistance, sub-national, municipal and private reserves are important alternatives. Often the importance of the ecological services of an area, such as the provision of water or forests for carbon sequestration, can be used as an argument to bolster the case for the creation and support of a protected area, be it public or private. Additional suggestions for civil society organizations include strengthened regulations to improve land titling security for community-based conservation initiatives and indigenous groups. Schemes such as Ecuador's Socio Bosque program (described in Chapter 6) can also be expanded and replicated in other countries as an additional tool to prevent further deforestation. Support for more comprehensive local land-use planning that incorporates the biodiversity value of land can be an effective mechanism to reduce deforestation rates. Working with the productive sector, especially producer associations, will also be important to use best practices to reduce the footprint of agriculture and diminish the environmental impacts of productive activities.

9. CLIMATE CHANGE ASSESSMENT

9.1 Overview of Climatic History and Effects on the Biota

The Andes today host a tremendous variety of climates that reflect the effects of topography, location along the western edge of the South American Continent and adjacent to cold Pacific waters, the movement of the Intertropical Convergence Zone, and easterly trade winds (Martínez *et al*. 2011, Young 2011). Uplift of the Andes began with the breakup of Pangea in the Triassic (252-201 million years ago), and continues to this day. Interactions among the Caribbean, Nazca, and South American plates have led to the current topography with three cordilleras and the outlying Sierra Nevada de Santa Marta in Colombia, inter-Andean valleys in Ecuador and Peru, high plateau in Bolivia, and high ridges in Argentina and Chile. The changing nature of this geography, especially the height of the Andes, has caused dramatic climate change over geological time.

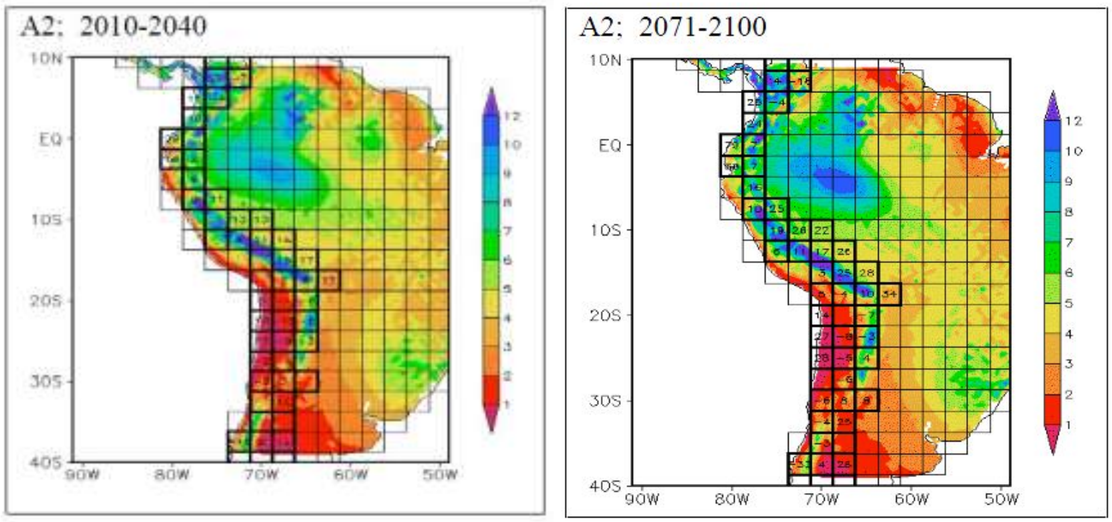
Andean climates have changed over geological time scales due to uplifting, global climate change, and the rearrangement of land masses (Hartley 2003). During much of the past 66 million years, the Andes rain shadow caused semi-dry conditions in the Central Andes. During the most recent several million years, global cooling and the cooling of the Humboldt Current led to the high aridity observed today on the west slope of the Tropical Andes south of the equator. During most of the last 2.6 million years, climates throughout the Andes appear to have been 5-9^{o} C cooler than present, although precipitation does not appear to have varied enough to cause different forest types from those that occur now (Bush *et al.* 2004). Researchers have identified a number of climate refugia throughout the Andes where distinct dry, humid, and super-humid regions are formed by local topography, and appear to persist over long time periods (Fjeldså *et al.* 1999, Killeen *et al*. 2007). As explained in Chapter 3, the combination of diverse climates and stable climate refugia has contributed to the high diversity and endemism now seen in the Tropical Andes.

9.2 Overview of Projected Impacts of Climate Change

Globally, land surface temperatures have risen at a rate of one quarter of a degree Celsius per decade since the 1970s (IPCC 2013). Temperatures have increased throughout the Tropical Andes during this time period, although at a slower rate than the global average (Marengo *et al*. 2011). Temperature increases appear to be greater at higher elevations (Marengo *et al*. 2011). Although precipitation has also changed across the Andes, climatologists have so far not detected any consistent patterns to the changes. Analyses are complicated by the increasing frequency and intensity of ENSO events, which have strongly influenced precipitation patterns over the past three decades (Marengo *et al*. 2011).

Climate models suggest that future temperature increases in the Andes under greenhouse gas emission scenarios that match current emissions (*e.g*., the A2 scenario from Meehl *et al*. 2007) will be on the order of 2-3^{o} C by mid-century and 3-4^{o} C by the end of the 21st century (Marengo *et al*. 2011). Most models also project a greater increase of temperature at higher elevations in the Andes (Bradley *et al*. 2006). The models also predict a 20-25 percent increase in precipitation on both slopes of the Tropical Andes. The western slope of the Andes may see a 70 percent increase in precipitation to an average of 2-4 mm per day. This area will still be dry compared to most other regions of the Andes, but the change nonetheless will be sufficient for noticeable vegetation changes (Figure 9.1, adapted from Marengo *et al*. 2011). In contrast, precipitation may decrease by 10 percent in the altiplano of the southern portion of the Tropical Andes (Marengo *et al*. 2011). Paradoxically, the altitude of cloud formation is projected to rise on the humid slopes of the Andes, leaving cloud forests without the vital daily influx of canopy moisture (Still *et al*. 1999, Foster 2001).

Figure 9.1. Projected 21st Century Mean Daily Precipitation (mm) in the Tropical Andes



Source: Marengo *et al*. 2011

Fine scale, localized climate projections for the Tropical Andes are difficult due to both the complex ways that air circulation interacts with the convoluted topography and a paucity of meteorological records. To date only two regional simulation models, one produced by the Hadley Centre in the United Kingdom and another by the Japan Meteorological Agency, have been run for the Andes, leaving a certain level of uncertainty about future climates. In addition, no one has successfully built projections of El Niño events into climate models, leaving open the question of how this major influence on Andean weather will affect future climates (Marengo *et al*. 2011). Nevertheless, the concordance of observations and projections assure us that the Tropical Andes will experience continued warming and changed precipitation patterns into the foreseeable future.

Ongoing climate change has already left a mark on natural systems in the Tropical Andes, and scientists have recently begun to document those changes. Careful observation along an elevational transect of the east slope of the Andes in Peru has demonstrated an upslope migration of trees at a rate of 2.5-3.5 vertical meters per year (Feeley *et al*. 2011). Treelines have also migrated upslope in the Andes, but more slowly (Lutz *et al*. 2013). Similarly, three high-elevation frog species have expanded their distributions upslope in Peru, tracking the retreat of glaciers (Seimon *et al*. 2007). Birds, too, have expanded their ranges upslope in the Tropical Andes (Forero-Medina *et al*. 2011).

Although the magnitude of change in specific climate variables will be smaller in the tropics than in temperate or arctic zones (Meehl *et al*. 2007), research increasingly indicates that the effects of climate change on species and systems may be more severe in the tropics. Species that do not generate body heat internally, such as most reptiles, amphibians, and insects, may be especially vulnerable to temperature changes due to the exponential increase in metabolism with temperature (Dillon *et al*. 2010). Tropical organisms are well known to have small physiological tolerances and narrow elevational ranges (Janzen 1967, Ghalambor *et al*. 2006), suggesting decreased ability to adapt to changing climate conditions. Species restricted to tropical montane elevational belts are likely to experience "range-shift gaps," such that their preferred climate may not overlap at all with their current distribution, and consequent increased risk of extinction (Colwell *et al*. 2008). Species currently occupying the upper levels of elevational gradients face "mountaintop extinction" – they simply have nowhere to go to track a favorable climate (Lenoir *et al*. 2008). A related phenomenon is the reduction in land area available at increasing elevations on mountain ranges, restricting the area available for dispersing organisms from lower elevations. Table 9.1 provides an overview of how different species groups differ in their vulnerability to climate change.

Table 9.1. Vulnerability of Tropical Andean Species to Climate Change

Species group	Vulnerability factors
Vascular Plants	• Species with limited dispersal ability may not be able to track favorable climates fast enough. • Páramo species (*Espeletia*, *Puya*, grasses) are vulnerable to changes in precipitation and invading species from lower elevations. • Puna grassland species may suffer from increased fire frequency and competition from species that invade to take advantage of changing climates. • High elevation species may have no higher elevation sites to disperse to. • Epiphytic plants (plants such as orchids and bromeliads that live attached to tree branches) vulnerable to reduced frequency of cloud-borne mist in montane forests. • Pollinator communities may change and reduce plant reproductive output. • Treeline species such as *Polylepis* may not be able to disperse upslope due to difficulty establishing in non-forest systems and lower humidity. • Species such as cushion plants that depend on glacial melt will decline as glaciers disappear.
Fishes	• Species adapted to high elevation streams and lakes (such as pupfishes and naked sucker-mouth catfishes) may not tolerate rising water temperatures. • Higher water temperatures contain less dissolved oxygen, making aquatic habitats less suitable for high-oxygen demanding fishes.
Amphibians	• Many species (for example glass frogs, harlequin toads, poison dart frogs) are sensitive to changes in precipitation and humidity. • Species adapted to glacier-melt streams will experience less habitat as glaciers melt. • Climate change can increase susceptibility to chytridiomycosis disease.
Reptiles	• Higher temperatures can reduce number of hours with favorable temperatures for foraging.
Birds	• Aquatic species (ducks, grebes, herons, ibises, flamingos) are susceptible to drying of Andean lakes and rivers. • Migratory species (flycatchers, warblers, vireos) are susceptible to mismatches of food availability throughout migratory cycle. • Species that depend on plants that are vulnerable to climate change will suffer from reduced habitat quality (for example Polylepis specialists such as the Critically Endangered royal cinclodes, *Cinclodes aricomae*).
Mammals	• Grazing species (guanacos, vicuñas, deer, pudu. chinchillas) are susceptible to changing species composition of puna grasslands. • High elevation rodents may have no higher elevation sites to disperse to.

Even species that are able to shift their distributions upslope are moving at rates far slower than required to keep up with the current rate of climate change (Feeley *et al*. 2011, Forero-Medina *et al*. 2011). If they could disperse upslope fast enough in undisturbed habitats, they face formidable obstacles in today's world: anthropogenic land use changes that create barriers to dispersal and invasive species that spread along disturbance corridors such as roads and pipelines and compete for resources with native species (Colwell *et al*. 2008). Treeline in the Andes presents yet another challenge to the adaptation of species to climate change. Long term observations indicate that treeline, such as the boundary between Yungas forests and Puna shrub and grasslands does not seem to move significantly in response to climate change, causing a hard barrier to upslope migration of trees and forest-dwelling organisms (Lutz *et al*. 2013, Rehm and Feeley 2013).

Just as species vary in their vulnerability to the effects of climate change, so do Andean landscapes. Using our current understanding of the key factors responsible for Andean ecosystem formation, the history of human intervention, and projected changes in climate, scientists have estimated the potential vulnerability of the major Tropical Andean ecosystems to climate change (Young *et al*. 2011). Table 9.2 summarizes these findings. The ecosystems most vulnerable to climate change, páramos and cloud forests, are those that have had the shortest history of human intervention (but see White 2013). Páramos are vulnerable to invasion by woody plants, localized elimination, and a lack of areas upslope available for associated species to colonize. Cloud forests are dependent on fragile atmospheric conditions that can change rapidly as climates warm. Aquatic systems are also highly sensitive to changing precipitation patterns as well as the reduction of glacial runoff caused by a dwindling glacial mass in the Andes. Ecosystems that have persisted after several millennia of human habitation are already fairly resilient and may maintain relatively more integrity under altered climatic conditions. Recently, a bioclimatic modeling exercise confirmed the relative ecosystem climate vulnerabilities described in Table 9.2 (Tovar *et al*. 2013).

Table 9.2. Vulnerability of Major Andean Ecosystems to Climate Change

Ecosystem[1]	Elevational Range (m)	Vulnerability to Climate Change	Examples of affected biological-priority KBAs
Páramo	> 3,000	**Highly vulnerable** due to isolated mountaintop locations, reliance on humid climate conditions, and vulnerability to destruction by upslope expansion of agricultural frontier.	Colombia: Parque Natural Regional Páramo del Duende, Páramos del Sur de Antioquia Ecuador: Reserva Ecológica Antisana, Reserva Ecológica Los Illinizas y alrededores
Humid Puna	2,000 - 6,000	**Moderately vulnerable** to invasion by woody vegetation if precipitation increases and vastly reduced land area at higher elevations than where currently distributed.	Peru: Ocobamba-Cordillera de Vilcanota, Kosnipata Carabaya Bolivia: Zongo Valley
Dry Puna	2,000 - 6,000	**Moderately vulnerable** to increased fire frequency that may alter species composition, the restriction of many species to specific soil types, and vastly reduced land area at higher elevations than where currently distributed.	None, although dry puna is found in the KBAs Covire (Peru) and Lagunas Salinas del Suroeste de Potosí (Bolivia)
Evergreen Montane	1,000 – 3,500	**Highly vulnerable** to increasing cloud levels, increased disturbance during	Bolivia: Bosque de *Polylepis* de Madidi, Yungas Superiores de

Ecosystem[1]	Elevational Range (m)	Vulnerability to Climate Change	Examples of affected biological-priority KBAs
Forest		extreme precipitation events, inability to disperse upward due to hard treelines, and destruction for agriculture expansion as reduced cloud cover increases suitability for farming.	Carrasco Ecuador: Parque Nacional Podocarpus Peru: Abra Patricia - Alto Mayo, Ocobamba-Cordillera de Vilcanota Venezuela: Parque Nacional Henri Pittier
Seasonal Dry Montane Forest	800 – 3,100	**Somewhat vulnerable** due to their fragmented distribution and sensitivity to a lengthier dry season, but adaptation to seasonal climates may cause resilience to climate change.	Colombia: Enclave Seco del Río Dagua Peru: Rio Utcubamba
Xerophytic Scrub	600 – 4,100	**Somewhat vulnerable** if dry seasons lengthen due to invasion of xeric shrubs, but adaptation to highly seasonal climates may cause resilience to climate change.	None, although xerophytic scrub is found in the KBAs Enclave Seco del Río Dagua (Colombia), Tambo Negro (Ecuador), Bagua (Peru)
Aquatic Habitats	Throughout	**Highly vulnerable** to changes in temperature, precipitation, and glacial runoff, all of which disrupt hydrological processes, and to competing human needs for fresh water.	Colombia: Laguna de la Cocha Peru: Cordillera de Colán

[1] See descriptions in Chapter 3.

Climate change also affects human society, of course, and how society responds will have a large impact on the fate of natural ecosystems. Planners of human communities, especially those concerned with infrastructure and agriculture, are just as concerned about climate change as natural resource managers. The major climate impacts of concern are:

- **Water availability.** Glacial runoff is a major source of freshwater in Colombia, Ecuador, Peru, and Bolivia (Magrin *et al*. 2007), especially for cities over 2,500 m elevation (Bradley *et al*. 2006). Reduced runoff not only threatens the supply of water for drinking and irrigation, but also for hydropower, a major energy source in the Andes (Bradley *et al*. 2006). Reduced glacial runoff will also lead to greater seasonal fluctuations in the height of the Amazon River, which will depend more heavily on season rainfall. These greater seasonal fluctuations will affect the constancy of hydropower generation and navigation. A combination of reduced glacial runoff and reduced precipitation will also affect water available to major coastal cities such as Chiclayo, Trujillo, Lima and Ica.
- **Extreme weather events.** Extreme weather that may be linked to climate change has lashed the Andean region with increasing frequency, with high rainfall events occurring in Venezuela and Colombia and severe hail storms in Bolivia (Magrin *et al*. 2007). Flooding in Ecuador in February, 2012 (13 deaths, 8400 displaced people), and in the Beni region of Bolivia in February, 2014 (59 deaths, 60,000 families evacuated), also fits this pattern. These events cause loss of life and damage to infrastructure and agriculture. Extreme events are difficult to predict in any timeframe (IPCC 2013), posing major challenges to planners and emergency response agencies.
- **Increased degradation of natural habitats.** Rising temperatures can increase fire frequency, reducing the quality of existing agricultural lands leading to additional clearing of natural habitats. The cycle can modify local weather conditions to increase warming and reduce rainfall, exacerbating the problem and causing more pressure on

natural systems. Biomass burning also lowers air quality, causing concern for human health (Magrin *et al*. 2007).

- **Disease outbreaks.** Climate change can allow diseases and their vectors to expand upslope, exposing previously unaffected human populations to disease (Beniston 2003, Magrin *et al*. 2007). Climate change may also create more favorable climate conditions for chytridiomycosis to attack amphibians (Pounds *et al*. 2006).
- **Effects on agriculture.** Climate change has already been implicated in the spread of fungal diseases maize, potato, wheat and bean crops in Peru (Torres *et al*. 2001), and will almost certainly affect more crops in the future. Uncertainties around the impact of increased temperature, CO_2 enrichment, precipitation trends, and emissions scenarios on agricultural crop yields and vulnerability to disease has led to great concern over the future food supply and the ability to feed growing populations throughout Latin America (Magrin *et al*. 2007).

Human responses to climate change will also affect natural communities. As glacial runoff declines, humans will seek to capture a greater portion of water in aquatic systems to maintain supplies for domestic use, agriculture, and hydropower, leaving even less for aquatic and riparian species. Warming temperatures allow potato farming and grazing to take place at higher elevations, causing destruction of páramo habitats that were previously too high to be of use to agriculture (Halloy *et al*. 2005). As described above, changing climates can cause other ecosystems such as cloud forests to become hospitable to cultivation. These indirect effects are difficult to predict, but nonetheless increase the vulnerability of Andean ecosystems to climate change.

9.3 Climate Change Resilience of Supporting Landscapes

One way to understand how vulnerable the hotspot is to climate change is to assess the resilience of corridors. Corridors that today encompass a broad diversity of climate regimes provide more regional-scale opportunities for species to track suitable climates as they move across the landscape and are therefore more resilient than corridors with less diverse climates. Spatial analysis scored each corridor for the diversity of bioclimates, as defined and mapped globally by Metzger *et al.* (2013). The Metzger *et al.* (2013) climate model, summarized to a 1-km^2 spatial resolution, describes major temperature and precipitation gradients. The diversity of combinations of these parameters (calculated using the Simpson Diversity Index) provides an indication of regional bioclimatic diversity.

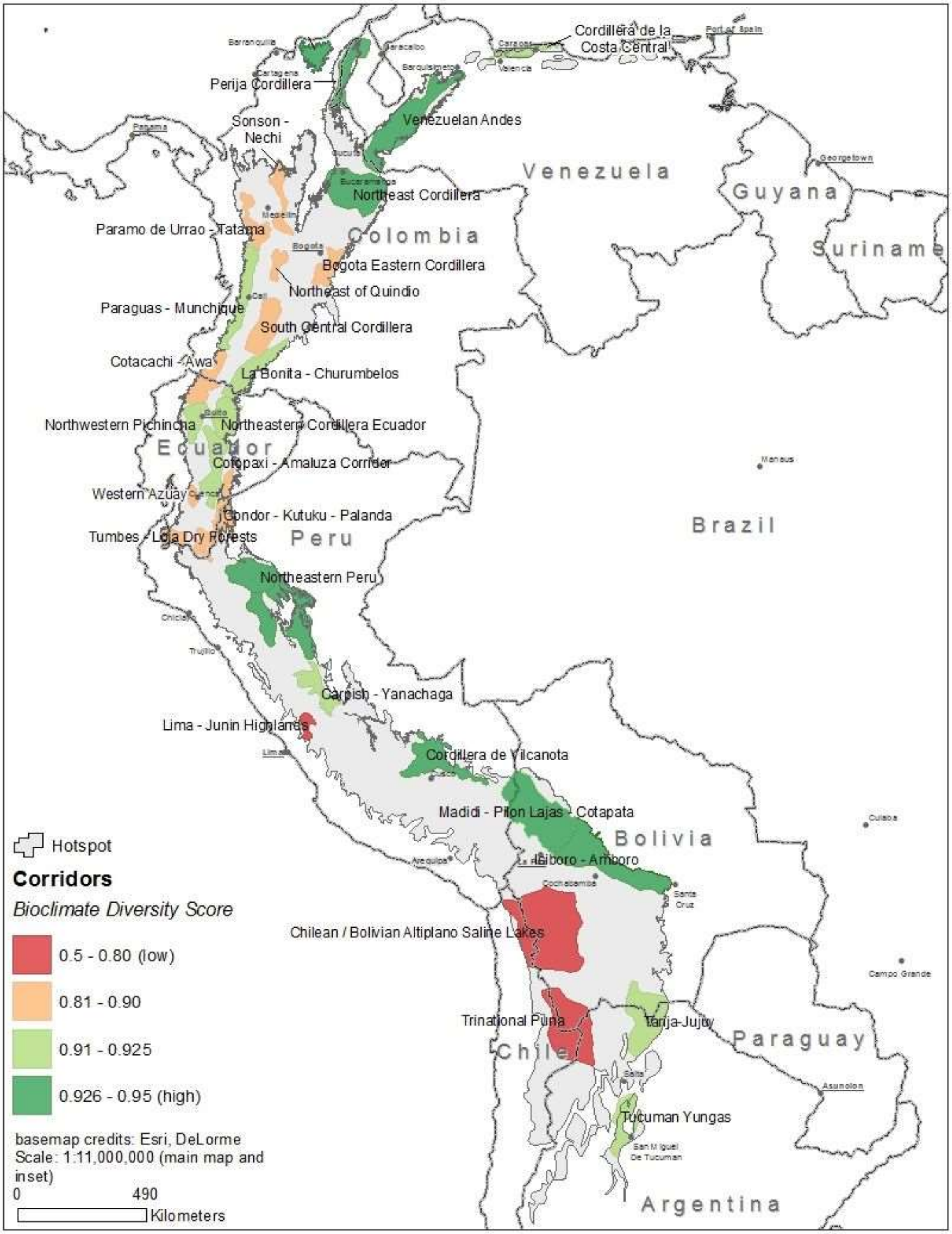
This analysis revealed that most corridors currently have a great diversity of bioclimates (Figure 9.2, Table 9.3). By this measure, the hotspot's corridors should be fairly resilient to climate change. This conclusion, of course, assumes that natural habitats within different bioclimates retain connectivity that allows the dispersal of plants and animals as they track favored climates. The overall high bioclimatic diversity is not surprising because of the steep elevation gradients that characterize the Andes and drive climate variability. The corridors with the lowest bioclimatic diversity are in the Pacific slope of the Andes near Lima, Peru, and southwestern extreme of the hotspot in the Bolivia-Chile-Argentina boundary area. Both regions are characterized by dry climates and less topographic diversity than elsewhere in the hotspot.

Bioclimatic diversity is just one measure of vulnerability to climate change. Species and habitats that are adapted to an extreme climate (very cold, very wet, very dry) that ceases to exist in the future are of course at great risk independent of how many different climates are nearby. Also, species and habitats that rely on glacier-driven hydrological cycles are also vulnerable to melting glaciers.

Table 9.3. Bioclimatic Diversity of Corridors in the Tropical Andes Hotspot

Corridor Name	Country	Bioclimatic Diversity
Tucuman Yungas	Argentina	0.90
Tarija-Jujuy	Argentina/Bolivia	0.91
Madidi – Pilón Lajas - Cotapata	Bolivia/Peru	0.92
Isiboro - Amboro	Bolivia	0.90
Chilean / Bolivian Altiplano Saline Lakes	Bolivia/Chile	0.52
Trinational Puna	Chile/Argentina/ Bolivia	0.60
Northeast Cordillera	Colombia	0.95
Bogota Eastern Cordillera	Colombia	0.89
South Central Cordillera	Colombia	0.88
La Bonita – Churumbelos	Colombia	0.92
Northeast of Quindio	Colombia	0.87
Sonson - Nechi	Colombia	0.82
Páramo de Urrao - Tatama	Colombia	0.82
Paraguas - Munchique	Colombia	0.92
Sierra Nevada de Santa Marta National Natural Park and surrounding areas	Colombia	0.88
Cotacachi - Awa	Colombia/Ecuador	0.89
Northwestern Pichincha	Ecuador	0.91
Northeastern Cordillera Ecuador	Ecuador	0.91
Cotopaxi - Amaluza	Ecuador	0.90
Western Azuay	Ecuador	0.82
Condor - Kutuku - Palanda	Ecuador/Peru	0.83
Tumbes - Loja Dry Forests	Ecuador/Peru	0.82
Northeastern Peru	Peru	0.93
Carpish - Yanachaga	Peru	0.90
Lima - Junin Highlands	Peru	0.55
Cordillera de Vilcanota	Peru	0.94
Venezuelan Andes	Venezuela	0.95
Perija Cordillera	Venezuela/Colombia	0.94
Cordillera de la Costa Central	Venezuela	0.90

Figure 9.2. Bioclimatic Diversity of Tropical Andes Hotspot Corridors



9.4 Review of Policy Responses

Despite the vulnerability of the region to the adverse impacts of climate change on human populations, biodiversity and infrastructure, national policy has tended to emphasize mitigation opportunities, especially in the form of policies, programs and projects for Reducing Emissions from Deforestation and forest Degradation[9] (REDD+).

Land use, land-use change and forestry[10] are important sources of emissions for most tropical Andes countries, despite the hotspot countries' relatively small overall contribution to global GHG emissions (Table 9.4). As a result REDD+ has been perceived by the majority of countries in the hotspot as a promising opportunity to mobilize additional financial resources for forest conservation and management under a global REDD+ mechanism. Reducing deforestation and degradation are considered to have significant co-benefits for biodiversity and forest conservation, and additional international finance is broadly seen as contributing to broader national sustainable development objectives. It should be noted however, that the Government of Bolivia has been a vocal critic of REDD+ in the negotiations of the United Nations Framework Convention on Climate Change (UNFCCC) and other global fora, arguing instead for a Joint Mitigation and Adaptation Mechanism that does not include market finance or any form of "mercantilization" (Ministry of Foreign Affairs 2012). Argentina, Chile and Venezuela have significant reforestation programs creating a distinct national-level profile, resulting in the Land Use, Land-Use Change and Forestry (LULUCF) sector being a net sink, with reforestation activities concentrated largely outside the hotspot. Despite the predominant role of plantations in the forestry sector, both Argentina and Chile have shown interest in REDD+ as a mechanism for addressing continuing significant deforestation pressures (concentrated in the Chaco region in the case of Argentina).

Table 9.4. Contribution of Tropical Andes Hotspot Countries to Global Emissions, and Land Use, Land-Use Change and Forestry (LULUCF) as a Percentage of National Emissions

Carbon footprint indicator	Country[1]						
	Argentina	Bolivia	Chile	Colombia	Ecuador	Peru	Venezuela
National total emissions as % of global total	0.97	0.32	0.20	0.46	0.30	0.32	0.83
Carbon stock in living forest biomass (million metric tons)	3,062	4,442	1,349	6,805	ND	8,560	ND
GHG emissions due to deforestation/degradation in 2010 (% national total)	20.3	59.5	12.4	19.3	61.7	46.5	32.2

Source: Global Forest Watch 2014
[1]Data are for the whole country and not restricted to the hotspot area.
ND=No data from this source

In the hotspot, land-based mitigation opportunities (*e.g.*, REDD) are primarily concentrated in forest ecosystems (montane and foothills), given the combination of relatively high carbon stocks (Penman *et al*. 2003: 3.157, Saatchi *et al*. 2009, Alvarez *et al*. 2012) and still significant

[9] REDD+ also encompasses forest conservation, enhancement of forest carbon stocks and sustainable forest management.
[10] With the agricultural sector constituting a very significant and often greater source of emissions for most countries.

deforestation risk. Puna and páramo in general offer fewer abatement opportunities due to their lower aboveground carbon stocks, reduced risk of emissions and the current focus of REDD+ on forests.

Hotspot countries are in varying degrees of preparation for national REDD strategies or plans. The United Nations Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation in Developing Countries (UN-REDD) and the World Bank´s Forest Carbon Partnership Facility (FCPF) are the two largest global multilateral programs supporting REDD readiness, and are currently supporting the majority of countries in the region to varying degrees (Table 9.5). While none of the hotspot countries has formally adopted a national REDD+ strategy, other strategy documents, particularly under these multilateral initiatives provide the most comprehensive official documents reflecting national programs and priorities (Table 9.6). National adaptation strategies are generally far less developed.

Table 9.5. Tropical Andes Hotspot Countries Participating in REDD+ Readiness Initiatives with the Support of the United Nations Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation in Developing Countries (UN-REDD) and the World Bank´s Forest Carbon Partnership Facility (FCPF)

Country	**UN-REDD**[11] (UN-REDD 2013)	**FCPF**[12] (FCPF 2013)
Argentina	Partner country	Participant
Bolivia	Receiving support to national program	Participant
Chile	Partner country	Participant
Colombia	Receiving support to national program	Participant
Ecuador	Receiving support to national program	
Peru	Partner country	Participant

The Cancún Agreement of the 16th Conference of the Parties (COP 16) of the UNFCCC describes a phased approach to national-level REDD+, moving broadly from preparatory "readiness" activities towards eventual results-based payments. International public funding from bilateral and multilateral donors has to date largely emphasized early-phase preparatory activities, rather than investments leading directly to emissions-reductions activities on the ground. This "readiness" funding has created an unprecedented surge in investment and capacity for monitoring forest cover and carbon stocks with important collateral benefits for conservation and biodiversity monitoring beyond REDD+. A summary of some of the larger REDD+ aid programs is provided in Table 9.7. Of the multilateral organizations the UN-REDD Program and the World Bank's Forest Carbon Partnership Facility make a particularly prominent contribution. While of the bilateral donors, the governments of Germany, Japan and the United States are

[11] UN-REDD partner countries "can benefit from receiving targeted support from the UN-REDD Global Programme and knowledge sharing, which is facilitated by the UN-REDD Programme's online community of practice. Partner countries also have observer status at UN-REDD Programme Policy Board meetings, and may be invited to submit a request to receive funding for a National Programme in the future, if selected through a set of criteria to prioritize funding for new countries approved by the Policy Board."

[12] An FCPF "REDD Country Participant is a developing country located in a subtropical or tropical area that has signed a Participation Agreement to participate in the Readiness Fund."

providing significant levels of support. Underscoring Peru's commitment to the UNFCCC process, Lima will host the COP 20 in December, 2014.

Table 9.6. National REDD+ and Adaptation Strategies and Plans in the Tropical Andes Hotspot Countries

Country	National REDD Strategy	National Adaptation Strategy
Argentina	Estrategia Nacional REDD+ (Secretaría del Ambiente y Desarrollo Sostenible de la Nación 2010)	
Chile	REDD+ strategy best currently summarized in FCPF RPP (Forest Carbon Partnership Facility 2013)	Climate change adaptation plan for biodiversity in development and in process of public consultation (Ministerio del Medio Ambiente 2013)
Colombia	In development. REDD+ strategy best currently summarized in FCPF RPP (Forest Carbon Partnership Fund 2011)	In development, with conceptual and methodological framework summarized (Departamento Nacional de Planeación undated)
Ecuador	In development. Ecuador has a National REDD+ Program developed under UN-REDD.	In development
Peru	In development. REDD+ strategy best currently summarized in World Bank FCPF RPP (Forest Carbon Partnership Facility 2011) National Forest Conservation Program for Mitigation of Climate Change	National Action Plan for Climate Change Adaptation and Mitigation (Ministerio del Ambiente 2010)

Table 9.7. Major International Donor Commitments for REDD+ Finance in Tropical Andes Hotspot Countries

Country	Donor	Amount	Source
Bolivia	UN-REDD	$4.7 M	UN-REDD
Colombia	USAID	$17.8 M	Forest Trends 2014 (REDDX website)
Colombia	Moore Foundation	$5.0 M	Forest Trends 2014 (REDDX website)
Colombia	FCPF	$4.0 M	Forest Trends 2014 (REDDX website)
Ecuador	KfW	$19.7 M	Forest Trends 2014 (REDDX website)
Ecuador	USAID	$6.2 M	Forest Trends 2014 (REDDX website)
Ecuador	GIZ	$5.7 M	Forest Trends 2014 (REDDX website)
Ecuador	UN-REDD	$3.9 M	Forest Trends 2014
Peru	JICA	$40 M	Forest Carbon Partnership Fund 2011
Peru	FCPF	$3.6 M	Forest Carbon Partnership Fund 2011
Peru	Moore Foundation	$1.9 M	Forest Carbon Partnership Fund 2011
Peru	KfW	$8.6 M	REDD Desk undated
Peru	GIZ	$17.2 M	Forest Carbon Partnership Fund 2011
Peru	Norway	$300 M	RPP Noticias 2014a

There is some movement on the part of major bilateral donors towards results-based payments, with conversations underway between the governments of Colombia and Ecuador and the governments of Norway (Norway's International Climate and Forests Initiative – NICFI) and the German-sponsored REM (REDD Early Movers Program) for $50-60 M payments for emissions or deforestation reductions in each country over the coming 3-5 years. Peru's progress with the

World Bank's FCPF would allow it to access $30-50 M in coming years under the Bank's Forest Investment Program (FIP). More recently Norway announced a large $300 M project to co-finance efforts to prevent deforestation in Amazonian and Yungas forests in Peru (RPP Noticias 2014a).

Project-level activity oriented towards the voluntary carbon market has also generated significant interest in some countries, with 7 projects currently validated under the Verified Carbon Standard (VCS undated) or the Climate, Community and Biodiversity Standard (CCB undated), the majority in Peru (Table 9.8).

Table 9.8. REDD+ Projects Validated or Verified under the Verified Carbon Standard (VCS) or Climate, Community and Biodiversity Standard (CCB), Tropical Andes Hotspot

Country	Project	Proponent	Standard	Location
Colombia	Empresas Públicas de Medellín REDD+ Project	Empresas Públicas de Medellín	CCB	Antioquia
Ecuador	Reforestation with Native Species in the Pachijal and Mira River Watersheds for Carbon Retention	Mindo Cloud Forest Foundation	CCB	Pichincha and Imbabura Provinces
Peru	Alto Huayabamba	Pur Project	VCS, CCB	San Martin Region
Peru	Biocorredor Martïn Sagrado REDD+ Project	Pur Project	VCS, CCB	San Martin Region
Peru	Alto Mayo Conservation Initiative	Conservation International	VCS, CCB	San Martin Region
Peru	Cordillera Azul National Park REDD Project	CIMA-Cordillera Azul	VCS, CCB	San Martín, Ucayali, Huánuco, and Loreto Regions
Peru	REDD+ de la Concesión de Conservación Alto Huayabamba	AMPA	CCB	San Martin Region

It is currently far from clear that market demand and prices will be able to meet the expectations of the projects already validated nor others in a still growing pipeline (Conservation International 2013). The Alto Mayo Conservation Initiative, executed by Conservation International, is the single largest private sector REDD+ project in the region, with a commitment of $3.5 M from the Walt Disney Company to purchase the carbon credits. However, Disney´s purchase from the Alto Mayo project represents only about 20 percent of the reductions to date, while other projects in the hotspot have the potential to offer an average of an initial 1.8 million tons of offsets a year, also competing for buyers. Overall, the near-term forecast for voluntary carbon market projects is not strong. The capacity of private project developers and some NGOs has grown, as evidenced by the successful validation of several projects in the hotspot and around the world, but there are concerns that policies and regulations are doing little to spur demand in the near future – with a potential growth in supply outstripping demand. In 2012, over 30 M tons of forest carbon credits went without a buyer, with projects expected to produce an additional 1.4 billion tons over the next 5 years, 93 percent from REDD Projects (Peters-Stanley et al 2013). Demand from domestic buyers may provide an outlet for some offsets, but is likely to be limited in scope. Bright spots include a recent deal between General Motors and the Government of Ecuador to offset emissions through a government sponsored conservation incentive program, and a small but pioneering transaction by Pacífico Seguros to purchase offsets from a REDD project developed by Peruvian civil society organization AIDER in Madre de Díos, Peru.

Overall, there is a trend towards growing public sector involvement in REDD+, with public financial flows from bilateral and multilateral flows currently dwarfing private investment (Table 10.3), and a strong emphasis on developing regulatory frameworks and REDD+ strategies at the national or subnational (*i.e*. state, department, province, region) level. Several of the Amazon regions of Peru which overlap the hotspot (Madre de Dios, Ucayali, Loreto and San Martín) recently joined the Governors´ Climate and Forests Task Force, a group of 22 states and provinces focused on developing jurisdictional programs for REDD. The voluntary carbon markets are also recognizing the move towards broader-scale approaches, with the Verified Carbon Standard having developed a Jurisdictional and Nested REDD Initiative which aims to harmonize REDD+ approaches working at the jurisdictional and project levels.

Government policies across the region have varied in their support and enabling frameworks for private project activity – with Colombia and Peru developing frameworks for the registration, approval and "nested" accounting of projects, while Ecuador, Venezuela and Bolivia have generally discouraged market-oriented projects. Throughout the hotspot there is a need for creative mechanisms that can successfully integrate and leverage both private and public sources of funding.

There is potentially significant overlap between the REDD+, adaptation and biodiversity conservation agendas, and while this linkage consistently receives mention in most official documents it is not generally a key element formally defining REDD+ or adaptation priorities, possibly as a result of the institutional separation of climate-change and biodiversity units characteristic of virtually all the environmental authorities in the region. Biodiversity considerations are frequently cited in national REDD strategy and program documents as an element of social and environmental safeguards (to avoid negative impacts) and as something to be included in integrated monitoring approaches (for example in Peru and Colombia's RPPs).

9.5 The Role of Civil Society

Civil society involvement in climate change policy formation and programs in the region has made important contributions in the form of policy engagement as well as developing research with pilot activities. There are a large number of civil society initiatives underway in all countries, providing an important complement to the larger-scale official government initiatives.

Civil society groups have been active in capacity building at multiple levels including technical assistance to regional and national governments (for example, Ecoversa in Colombia, AMPA, CIMA, AIDER in Peru and international conservation organizations like WWF, CI and TNC across the region) and to local communities. Of particular note are multi-stakeholder REDD+ working groups including "Mesas REDD+" in Colombia (Mesa REDD Colombia undated), Ecuador and Peru (Grupo REDD Peru undated) as well as at the subnational level, including a process in Madre de Dios, Peru, supported by CEPF. These working groups are playing an important role in contributing to informing national (and subnational) REDD+ strategies, programs and policies. As REDD+ evolves from its early focus on project activities to broader policy and regulatory frameworks for reducing deforestation and promoting low-emissions rural development, there is an important opportunity for civil society to contribute to shaping planning, policies and investment decisions and working to ensure that biodiversity conservation objectives are aligned with the REDD+ agenda. Staff at governmental ministries and agencies, despite significant support from bilateral and multilateral sources, are overextended and face significant capacity gaps. Shaping these public discussions, policies and investment decisions is probably the most important opportunity for civil society at the current juncture for REDD+. While there are myriad opportunities for civil society organizations to participate in government consultations, working groups and workshops, few have dedicated staff or budgets for this purpose and in this sense the opportunities to participate constitute both a valuable chance to contribute as well as a net drain on limited institutional resources.

Civil society has also played a particularly prominent role in the development of offset projects for the voluntary carbon market from the early days of the forest carbon market, with the majority of REDD+ projects in the hotspot and beyond, led by local and international NGOs. While the market outlook for these projects is challenging (see above), these projects currently provide one of the few vehicles for private sector funding to REDD+ and contribute valuable learning experience on methodological issues, stakeholder engagement and effectively combatting deforestation at local scale.

At the regional level, several networks of CSOs are actively involved in climate change and REDD+ issues including:

- Articulación Regional Amazónica (ARA), a network of CSOs from the Amazon region focused on exchange of information and experiences relevant to policy and projects for forest conservation and development.
- Plataforma Climática Latinoamericano, a network of Latin American CSOs promoting the integration of climate change considerations as a priority for national and international policy making.
- Red Amazónica de Información SocioAmbiental Georferenciada (RAISG), generating and disseminating data relevant to REDD and climate change adaptation for the Amazon region.
- Coordinadora de Organizaciones Indígenas de la Cuenca Amazónica (COICA) is promoting an alternative vision which they call Amazon Indigenous REDD (RIA, for its initials in Spanish), with active engagement at the national and international policy level and several pilot projects in early stages of development, including at least one in the hotspot (Shuar and Achuar territories in Ecuador).

Adaptation has received far less attention and funding in the civil society sector, despite its critical importance for the long-term success of conservation efforts. With a combination of adequate funding and research expertise, analytics and outreach, civil society organizations could do far more to contribute to highlighting the potential impacts and adaptation strategies in the face of global climate change as they relate to biodiversity conservation and ecosystem services.

9.6 Climate Mitigation and Adaption Opportunities

As glacial water sources continue to decline and extreme climate events increase, healthy ecosystems will play an increasingly important role in ensuring adequate and stable water supplies. There is emerging interest globally in the concept of ecosystem-based adaptation (Colls *et al*. 2009, Vignola *et al*. 2009, Andrade Perez *et al*. 2010), with a need for enhancing and redirecting investment flows, proving best practices and evaluating effectiveness for resilient "natural infrastructure." Ecosystem-based adaptation has clear synergies between climate change adaptation, biodiversity conservation and basic human needs.

Adaptation to climate change will also imply rethinking and anticipating the design of conservation strategies and protected areas systems in light of dramatically changing conditions. Protected areas can promote resiliency of natural systems and human communities to climate change (Dudley *et al.* 2010). Aside from serving as carbon storage banks, protected areas also help buffer the effects of extreme weather events, stabilize slopes, prevent biodiversity loss, ensure water supplies, provide diverse pollinators for crops, and lessen local temperature and humidity extremes.

Beyond these activities, there are a number of ways that civil society can engage to lessen the impacts of climate change on biodiversity. They can engage in the political process to strengthen policies for adaptation and mitigation for conservation and ecosystem service resiliency and promote policies that minimize the detrimental indirect effects of changing land use patterns caused by human adaptation to climate change. Globally, significant resources (over $2.7 billion through 2012) are being mobilized for adaptation funding (Schalatek et al. 2012). Thus civil society organizations should seek opportunities to leverage adaptation finance by developing creative new approaches for resilient ecosystems in order to meet conservation and climate change objectives. Good places to start would be KBAs such as the Zona Protectora Macizo Montañoso del Turimiquire in Venezuela and Chingaza Natural National Park in Colombia, and Mindo and western foothills of Volcan Pichincha in Ecuador that provide essential water provisioning services to major cities.

Civil society organizations can contribute to determining how government REDD+ funding is deployed, to strengthen conservation outcomes. Recent interest by the World Bank and the governments of Norway and Germany in REDD+ projects in Colombia, Peru and Ecuador provides an important opportunity. Civil society organizations can also offer technical assistance to national, and particularly subnational, governments in developing REDD+ frameworks to effectively reduce deforestation pressure.

Civil society organizations involved in conservation planning can work to maximize landscape connectivity to promote plant and animal dispersal across environmental gradients, and target climatically stable regions to "conserve the stage" (Anderson and Ferree 2010) for biological interactions and resilience to climate change. To be successful, the staffs of these organizations need to develop experience in the relatively new fields of climate change impacts and adaptation planning.

10. SYNOPSIS OF CURRENT INVESTMENT

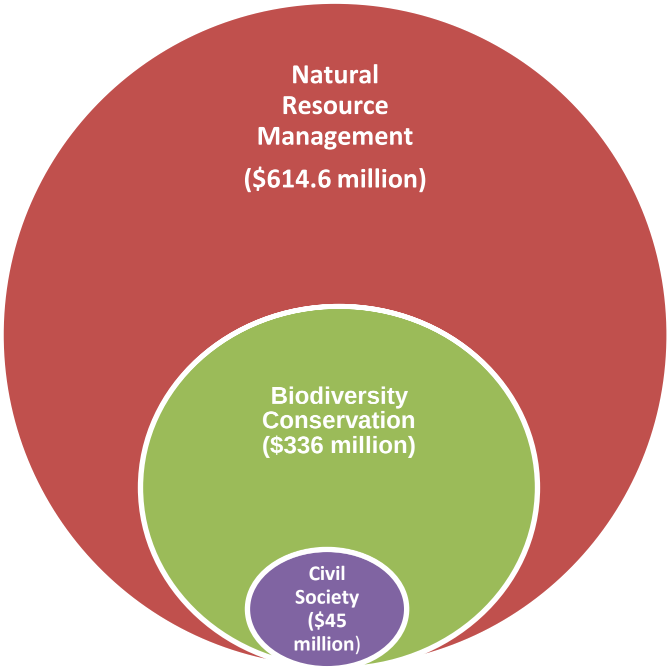
This chapter reviews investments in natural resource management and biodiversity conservation in the Tropical Andes Hotspot from 2009 to 2013. It finds that national governments and international donors funded 712 investments totaling $614.6 million for the five-year period for a wide variety of environmental and natural resources management projects and operations, including climate change adaption, watershed and forest management, institutional support, and biodiversity conservation. [13] Approximately 57 percent of the this funding, $350.2 million, supported national-level programs that benefitted the hotspot, while 43 percent, $264.2 million, supported programs and projects located directly in the hotspot.

As Figure 10.1 shows, $336 million, 54 percent of the total, was channeled for activities with biodiversity conservation as a principle objective. About 7 percent of the total environmental funds, equally $45 million, was channeled through civil society organizations. Put in context against the large expanse of the hotspot, these investments were spread thin, with $0.40 invested per hectare of the hotspot per year for biodiversity conservation, of which only $0.06 per hectare per year was implemented by civil society organizations. Put another way, funding for civil society organizations equaled $12.5 million per year to cover an area three times the size of Spain, across seven countries.

[13] Includes investments made between January 1, 2009, and December 31, 2013, organized by source (national, bilateral, multilateral, foundations, public and private sectors, and strategic funding initiatives), country and thematic areas. Data came from web sources, donors and national stakeholder consultation workshops. Each investment was registered and analyzed in the following way:

i. Data were collected on project title, donor, funding type, country and region of implementation, grant and co-financing amounts, co-financiers, and recipients;
ii. Each investment was assigned a conservation theme based on investment title and description;
iii. To avoid double counting, only direct donor contributions to each project and direct cash contributions through co-financing were included; in-kind contributions were excluded;
iv. Country-level investments that were not targeted specifically at the Tropical Andes region were adjusted to the proportion of the country in the hotspot (Table 4.4). This is a proxy value that assumes that national-level investments were uniformly distributed across the country, which may under- or over-estimate real expenditures affecting hotspot conservation.
v. Only those investments that affected at least 20% of the hotspot area were included (thus excluding country-level investments in Argentina, Chile and Venezuela). A similar threshold was used to exclude investments that disbursed less than 20% of funding within the target period of 2009 to 2013;
vi. Data collection relied on publicly available sources describing conservation investments, and it is likely that some funding sources and projects were missed and others may have been under or overestimated.
vii. Data regarding national investment in protected areas management were very limited for all hotspot countries, and where available, did not break down budgets for individual protected areas. Protected areas budgets in Ecuador from the national government was was only available for 2012.

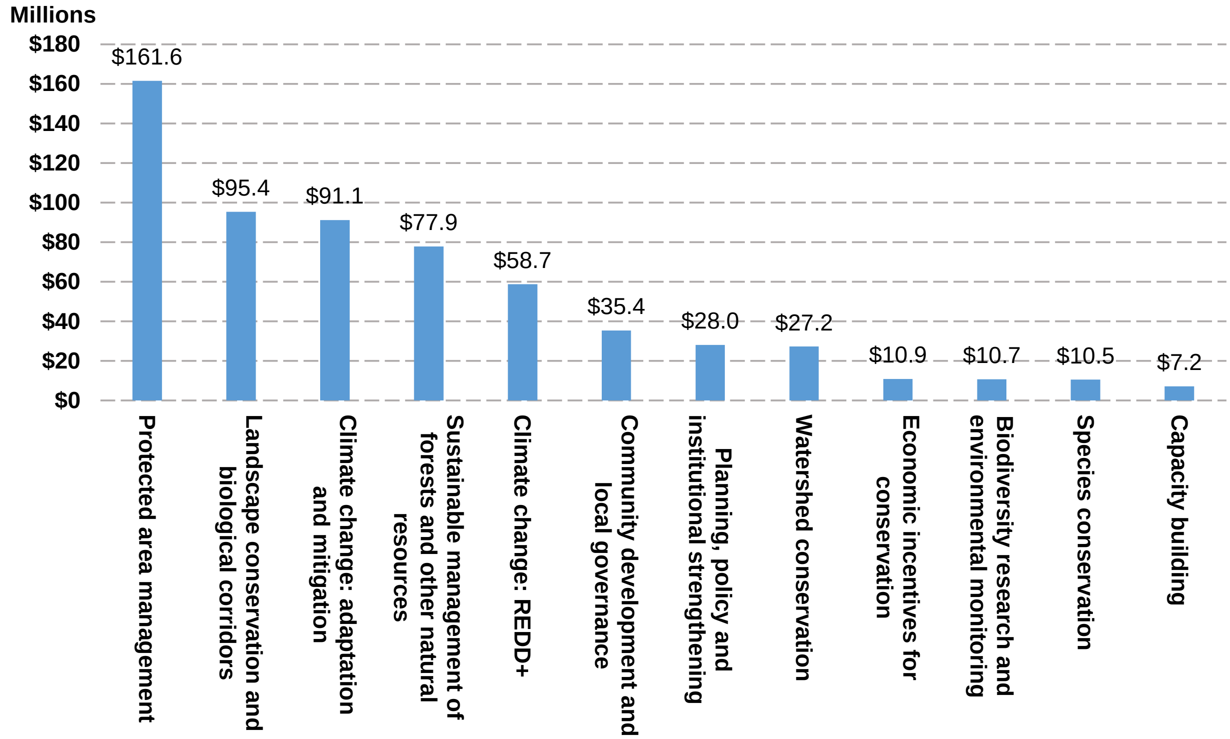
Figure 10.1. Breakdown of Investment for Natural Resources Management in the Tropical Andes Hotspot, 2009–2013



10.1 Thematic Distribution of Biodiversity Conservation Investment

Funding for natural resources management activities supported 12 thematic areas, as shown in Figure 10.2. Four thematic areas accounted for 70 percent of all investments: protected area management (26 percent of total investments), landscape conservation and biological corridors (16 percent), climate change adaptation and mitigation (15 percent), and sustainable management of forests and other natural resources (13 percent).

Figure 10.2. Funding for Natural Resources Management in the Tropical Andes Hotspot by Theme, 2009-2013 (Total, $614.6 million)



10.1.1 Investments in Biodiversity Conservation

Five thematic areas totaling $336.9 million directly supported biodiversity conservation: protected areas management, landscape conservation and biological corridors, climate change - REDD+, species protection, and biodiversity research.

10.1.1.1 Protected Area Management

Protected area management received $161.6 million, averaging $32.3 million per year for the seven countries or $4.6 million per country per year, from international donors, national treasuries, and protected areas revenue streams. Funding supported national agencies responsible for protected areas management systems as well as individual protected areas and their buffer zones. International donations, national governments, park system revenues, and dedicated trust funds comprised the principle sources of funding. International donors were a particularly important funding source for under-resourced protected areas systems. Table 10.1 summarizes expenditures for protected areas in the hotspot gathered for the ecosystem profile. For comparison, the table also includes findings from a UNDP assessment conducted in 2010 of protected areas budgets for six Andean countries.

Table 10.1. Protected Areas Funding by Country

Country	Size of Protected Areas in Hotspot (ha)	Average Funding per Year (2009-2013) ($)	Hotspot Average Funding per Hectare per Year (2009-2013) ($)	National Average Funding per Hectare per Year, Not Adjusted for Hotspot ($)[1]
Argentina	3,587,167	Not available	--	8.56/ha
Bolivia	5,616,076	2.8 million	0.51	0.32/ha
Chile	997,380	Not available	--	0.60/ha
Colombia	3,955,774	11.7 million	2.95	1.75/ha
Ecuador	1,783,394	3.2 million	1.77	0.82/ha
Peru	5,740,362	14.6 million	2.54	0.72/ha
Venezuela	1,800,242	Not available	--	1.01/ha

[1]Source: UNDP (2010). Note that UNDP figures include funding for private and subnational protected areas as well as for national protected area systems.

Argentina's national park system receives 53 percent of its funds from national sources, 17 percent from donations and loans, and 30 percent from resources generated by the parks themselves. (RedLAC 2010). Information on protected area budgets was not available.

Bolivia's total budget for SERNAP, the national protected areas service, totaled $14.2 million for operations inside hotspot parks and reserves. The national government provided $2.1 million to support 15 protected areas covering 5.6 million hectares in the hotspot. The EU was the largest multilateral donor to SERNAP with a contribution of $7.7 million, while Germany ($2.5 million) and Denmark ($1.7 million) were the largest bilateral donors. In addition, FUNDESNAP (see Section 10.6), a Bolivian foundation dedicated to supporting the country's protected areas system, played an important role. The foundation has a $40-million portfolio that includes endowment funds from the GEF, Great Britain, Switzerland, the IDB, the World Bank, Gas Oriente Boliviano, and Fondo Indigena. Within this portfolio, Madidi and Pilón Lajas national parks have separate endowment funds. In total, the endowment funds yield approximately $800,000 annually to support Bolivia's protected areas system through SERNAP. On average, funding to manage Bolivia's vast protected areas system inside the hotspot totalled a mere $0.51/hectare, the smallest amount identified by the profiling team.

In Colombia, funding to manage the 77 national parks in the hotspot covering nearly 4 million hectares was $58.3 million for five years, of which $33.2 million originated from the national government (Parques Nacionales de Colombia 2014). The GEF ($20.5 million) and the United States ($4.5 million) were the most significant international donors. Average yearly funding totaled $2.95/hectare for protected areas in the hotspot, which is the highest funding level in the hotspot.

In Ecuador, funding to manage 20 protected areas located in the hotspot and spread over 1.7 million ha totaled $15.8 million, of which the national government provided $2.3 million. The largest international funding sources were Germany ($6.8 million) and the GEF ($6 million).

In Peru, funding to manage 77 protected areas covering 5.7 million hectares totaled $72.9 million, which represents nearly half of all funding for protected areas in the hotspot. Of this, the national government provided $26.8 million, with the GEF ($27 million) and the United States ($12.9 million) providing the greatest share of international support. The Peruvian National

Parks and Protected Areas Trust Fund (PROFONANPE) also contributed a significant share of the protected areas budget. Furthermore, individual protected areas also receive funding from regional governments and municipalities, endowment funds, and income generated within the park, including entrance fees, payments for ecosystem services and REDD projects.

In Venezuela, the national park administrative authority, INPARQUES, manages 18 protected areas covering 1.8 million hectare in the hotspot. INPARQUES received 95 percent of its funding from the national government and 5 percent from income generated within the parks themselves. Information from INPARQUES indicates that their annual budget increased from $0.004/hectare in 2000 to $0.074/hectare in 2010. However, an independent assessment of Venezuelan protected areas found that its budget was still inadequate to halt the decline of the country's protected areas (Red ARA 2011).

10.1.1.2 Landscape Conservation and Biological Corridors

Landscape conservation and biological corridors includes projects supporting land-use planning, enhancing connectivity and sustainable production over large landscape areas and corridors, as well as mitigating the impacts from large-scale transportation infrastructure and extractive-industry projects. With a total of $95.4 million, this category included large projects for sustainable agriculture and livestock production with a conservation focus, strengthening of connectivity of ecosystems through biological corridors integrated with sustainable production, and the mitigation of large-scale infrastructure projects (*e.g.*, the Northern Corridor Road Construction Project in Bolivia and the Interoceanica Sur in Peru).

10.1.1.3 Climate Change REDD+

REDD+ received growing attention, especially from bilateral and multilateral donors, with an allocation of $58.7 million to fund the conservation of natural forests. Some concern was expressed in national consultation workshops that REDD+ funding was displacing funding for other biodiversity conservation priorities. Major bilateral donors were the United States, Switzerland and Germany. From the private sector, the Walt Disney Company purchased $3.5 million worth of REDD credits in Alto Mayo, Peru.

10.1.1.4 Biodiversity Research and Environmental Monitoring

Biodiversity research and environmental monitoring totaled $10.7 million, with a significant share coming from private foundations, including the MacArthur Foundation, the Blue Moon Fund, the Gordon and Betty Moore Foundation and the John Fell Fund. This category was characterized by a large number of small grants for research and monitoring of species and ecosystems. Research and monitoring specifically related to climate change or REDD is reflected in the climate change category.

10.1.1.5 Species Conservation

Many biodiversity conservation investments have species conservation as an overall goal, although distinquishing funding amounts specifically for this thematic area is difficult. Of the $10.5 million identified for species, projects focused on migratory birds, amphibians, and a variety of nationally or globally endangered species. The GEF was the only multilateral donor to fund species conservation, at $4 million, mostly to support a regional project to protect AZE sites. The USFWS provided the most funding of the bilateral donors, contributing $5.8 million for a variety of projects. Private foundations and private sector donors provided small grants to civil society and universities for species conservation. The Mohamed bin Zayed Conservation Fund filled an important niche in safeguarding globally threatened species by funding 62 small projects totaling $0.5 million. The Save our Species initiative, a coalition of the IUCN, GEF and the World Bank, invested in only two projects in the hotspot, one on Endangered frogs ($40,000) and another for an Endangered bird (amount not specified; Save our Species 2014).

10.1.2 Other Investments in Natural Resources Management

Natural resources management investment other than the categories reviewed in the previous section totaled $278.4 million and often supported activities more indirectly in benefit of biodiversity by funding such activites as institutional strengthening of national environmental ministries, territorial planning, watershed management, mitigation of impacts from infrastructure projects, climate change adaption, and community development. In several instances, donor support for integrated approaches to mainstream biodiversity considerations into broader development frameworks created difficulties in distinguishing biodiversity investments from other natural resource management objectives.

10.1.2.1 Climate Change Adaptation and Mitigation

Climate change adaptation and mitigation received a total of $91.1 million to strengthen national climate change institutions and adaptation activities, especially in the high Andes. These adaptation projects included ecosystem-based adaptation that benefitted biodiversity as well. In many cases, information was insufficient to determine what proportion of budgets for mitigation and adaptation projects specifically targeted forests and other ecosystems. Two major climate change projects financed by the IDB for Peru and Colombia were excluded from this analysis because it was not possible to disaggregate distinct funds for natural resources management and biodiversity conservation from other activities. The largests international donors for climate change adaptation and mitigation were the GEF, Japan, Switzerland, the United States and Germany.

10.1.2.2 Economic Incentives for Conservation

Economic incentives for conservation totaled $10.9 million, and included support for established national incentive programs (*e.g.,* Socio Bosque in Ecuador) and for local pilot projects based on conservation agreements, ecosystem services payments and other mechanisms.

10.1.2.3 Sustainable Management of Forests and Other Natural Resources

Projects related to the sustainable management of forests and other natural resources were funded mostly by bilateral and multilateral donors, totalling $77.9 million. Projects emphasized the sustainable management of natural ecosystems (primarily forestry-related, multi-component development projects focused on natural resource management).

10.1.2.4 Community Development and Local Governance

Rural community development and local governance projects with conservation objectives received $35.4 million, specifically for sustainable management of natural resources in and around protected areas and for forestry and agricultural programs to improve livelihoods. The true value of funding for community development activities is undoubtedly higher because other thematic areas in this analysis also include community development activities. The GEF SGP supported a large number of community development and livelihoods projects under this category. Investments for local governance also were a significant portion of funding under this category, with the majority focused on strengthening local stakeholders, community environmental management, decentralization and supporting local and indigenous territorial management.

10.1.2.5 Planning, Policy Development and Institutional Strengthening

Funds for planning, policy development and institutional strengthening totalled $28 million, and aimed to strengthen sustainable development policies, plan environmental activities and support national institutions. Multilateral and bilateral donors were the most significant supporters for planning and strengthening national and subnational environmental institutions and for developing environmental policies, programs, regulation and legislation, and enforcement and national strategies. Many projects had broad objectives and covered diverse activities, making it difficult to assign a budget specifically for biodiversity conservation.

10.1.2.6 Watershed Conservation

Watershed conservation investments totaled $27.2 million and sought to support two kinds of initiatives: large-scale water basin management programs emphasizing land management and conservation, and payments for ecosystem services, including water funds in Ecuador, Colombia and Peru. The World Bank, the EU, the IDB, Denmark, Switzerland and Germany were among the largest funders.

10.1.2.7 Capacity Building

Capacity building received $7.2 million, mostly focused on strengthening civil society to engage in sustainable development, participatory natural resources management, outreach and environmental education. Most projects were relatively small, with the exception of large projects funded by Denmark to strengthen civil society in Bolivia.

10.2 Investments in Civil Society

Civil society organizations, particularly local and subnational groups, faced limited access to conservation financing, often relying on private foundations and charities. National environmental funds also played a valuable role in supporting CSOs.

Summing all known direct funding to local and national CSOs (foundations, CEPF, GEF SGP, and a few bilateral investments) yields a figure of $45 million over five years. This figure is a minimum, as it does not include funds that reach CSOs through government and bi/multilateral agency contracts or subawards, conservation trust funds (such as FONDAM in Peru or Acción Ambiental in Colombia) or through second-tier subawards from government contractors. This amount may be particularly important for national and local NGOs that may not have the capacity or track record to access international funding sources directly. However, these indirect funding flows are complex and difficult to calculate. Still, the estimate of $45 million over five years provides an indicator of the limited amount of funding available to local and sub-national CSOs for conservation activities in the seven hotspot countries.

The three largest funding sources of natural resources management in the hotspot between 2009 and 2013 were multilateral agencies, bilateral agencies, and national governments. The vast majority of these funds were not channeled to national or local CSOs, as these donors distributed investments directly to national governments and international NGOs that were responsible for further disbursement. Consultation workshop participants highlighted the challenges faced by national and local NGOs in securing funding and perceived competition from international NGOs for access to resources both from foundations and bilateral/multilateral donors.

The CEPF and the GEF SGP are the two multilateral funding sources that are exceptional in providing the majority of their funding support directly to CSOs in the Andes. These two funding sources combined constituted just 1.7 percent ($9.8 million) of overall hotspot funding. These sources generally distributed funds directly to local NGOs for community and local sustainable development activities, capacity building and training, and protected areas management. According to stakeholders consulted for the ecosystem profile, a limitation of GEF SGP funds is that they generally support short-term projects of just one to two years, making it difficult to achieve financial sustainability for these projects. In addition, required matching funds can be challenging for local NGOs to secure.

10.3 Strategic Funding Mechanisms

Numerous strategic funding mechanisms have emerged as important environmental funding mechanisms in the hotspot in recent decades, including Conservation Trust Funds (CTFs), water funds, and forest conservation and REDD+ mechanisms. These mechanisms were not included as sources or donors in the total conservation investment figures reported above because they are vehicles for disbursing funds from existing funding sources identified in previous sections.

10.3.1 Conservation Trust Funds

As an effort to provide financial stability to conservation efforts in the region, conservation organizations, national and international, promoted the creation of conservation trust funds in the 1990s. CTFs are private, legally independent grant-making institutions that provide sustainable financing that can be used to support the long-term costs of protected areas and biodiversity conservation, among other goals. They are frequently financed through debt swaps, grants or donations, or other financing mechanisms such as earmarked taxes and fees. CTFs are seen as important in providing stable flows of funding from endowments (as well as sinking funds) that are largely independent of changes in governmental authorities and regimes. The total expenditures from CTFs were $60.7 million between 2009 and 2013 (Table 10.2). Through its previous investments, CEPF co-financed projects with four trust funds -- FUNDESNAP, Fondo Accion, FAN, and FONDAM – for protected areas management and sustainable livelihoods projects.

Peru's two CTFs—FONDAM (*Fondo de las Americas*, a previous CEPF grantee) and PROFONANPE (*Fondo de Promoción de las Áreas Naturales Protegidas del Perú*) —accounted for 53 percent of all conservation trust funding in the hotspot (FONDAM and PROFONANPE 2014). PROFONANPE invested $16.4 million on the management of natural protected areas, strategic and operational planning, and support to civil society. FONDAM provided $15.9 million to support community and sustainable development activities inside protected areas and in their buffer zones.

Colombia's two CTFs—*Fondo Patrimonio Natural* and *Fondo para la Acción Ambiental y la Niñez*—invested $22.7 million (Fondo Patrimonio Natural and Fondo Acción 2014). The *Fondo Patrimonio Natural* provided $14.3 million towards conservation of natural areas and the *Fondo para la Acción Ambiental y la Niñez* invested $8.4 million in biodiversity protection and sustainable use by supporting sustainable production systems.

Bolivia's CTF, *Fundación para el Desarrollo del Sistema Nacional de Áreas Protegidas* (FUNDESNAP) provided $4 million for protected area management, capacity building and biodiversity conservation in corridors such as the Vilcabamba-Amboró Conservation Corridor, including some $655,000 in CEPF support (FUNDESNAP 2014).

Ecuador's CTF, *Fondo Ambiental Nacional* (FAN) provided $1.6 million (FAN 2014). The fund managed multiple sub-accounts, including the *Fondo de Areas Protegidas* (FAP), which focused on protected area management with capital of $28.5 million. In 2012, the FAP dispersed $1 million to Ecuadorian protected areas. This amount was higher than in previous years due to forest fire emergencies that occurred during the dry season in several national parks and ecological reserves (Silva Lachard 2013). The *Fondo de Aportes Especiales Socio Bosque* is a separate FAN subaccount that supports the country's Socio Bosque forest conservation program ($7.5 million).

Table 10.2. Active Conservation Trust Funds in the Tropical Andes Hotspot

Country	Name of Conservation Trust Fund	Activities	Estimated Total Investment 2009-2013 ($)
Bolivia	Fundación para el Desarrollo del Sistema Nacional de Áreas Protegidas (FUNDESNAP)	Protected area management, capacity building and biodiversity conservation in corridors such as the Vilcabamba-Amboró Conservation Corridor.	4 million
Colombia	Fondo Patrimonio Natural	Conservation of natural areas.	14.3 million
	Fondo para la Acción Ambiental y la Niñez	Biodiversity protection and sustainable use by supporting sustainable production systems.	8.4 million
Ecuador	Fondo Ambiental Nacional (FAN)	Protection, conservation and improvement of natural resources and the environment.	1.6 million
Peru	Fondo de las Americas (FONDAM)	Community and sustainable development activities inside protected areas and in their buffer zones.	15.9 million
	Fondo de Promoción de las Áreas Naturales Protegidas del Perú (PROFONANPE)	Management of natural protected areas, strategic and operational planning, and support to civil society.	16.4 million

10.3.2 Water Funds

Conservation organizations have found water to be a conservation target to promote conservation of natural landscapes in the region, generating commitments from stakeholders not necessarily motivated by emblematic species or ecosystems. Using trust funds as the financial vehicle to channel resources from water users, resources can be leveraged to invest in conservation measures for upstream natural areas and landscapes important for water provision. Inspired by the model of the Water Fund in Quito (FONAG), supported by The Nature Conservancy and USAID, water trust funds can be created with public and private financial managers depending on the national legislation. NGOs such as Grupo de Emprendimientos Ambientales (GEA) and Nature and Culture International (NCI) have led efforts to establish water funds to conserve their local watersheds in Peru and Ecuador, respectively.

Water funds can be a powerful vehicle for channeling resources for conservation from local stakeholders and beneficiaries interested in security of water supply and water quality. Users of water pay into a fund that in turn pays for conservation of the watershed that protects the water supply. Watershed protection can take several forms, including preventing disturbance to an existing forest, protecting riparian systems within working landscapes or reforesting degraded land in the watershed. Some water funds, such as in the Valle del Cauca in Colombia, involve partnerships among private businesses, environmental authorities, NGOs, grassroots groups and local government. Because most KBAs are located in watersheds that provide water to human communities, industries, hydroelectric plants, and/or agriculture, there is an enormous potential for water funds to contribute to KBA protection (see Chapter 4). While there are several notable successes in the region, there is an enormous need and potential for scaling up and replication. The Watershed Services Incubator in Peru (MINAM and Forest Trends, with the support of SDC) represents one ambitious effort to support pilot projects in irrigation, hydropower and municipal water supply, and promote sector-wide policy linkages for upscaling. Support to water funds has the potential to leverage significant resources and build broader political constituencies for conservation.

The hotspot hosts 10 active water funds (Table 10.3): five in Ecuador, three in Colombia, one in Peru and one in Venezuela (Fondos de Agua 2014). Although funding amounts are not available for most water funds, the Quito fund provides nearly $1 million each year in disbursements for conservation projects.

Table 10.3 Active Water Funds in the Tropical Andes Hotspot

Country	City or Region	Name of Water Fund	KBAs/Corridors
Colombia	Valle del Cauca	Agua por la Vida y la Sostenibilidad	Parque Nacional Natural Farallones de Cali
	Bogota	Agua Somos	Chingaza Natural National Park and surrounding areas, Parque Nacional Natural Sumapaz
	Medellin	Cuenca Verde Fondo de Agua	None
Ecuador	Azuay and Canar Province	Fondo del Agua para la conservación de la cuenca del río Paute (FONAPA)	Western Azuay Corridor, Parque Nacional Sangay, Bosque Protector Dudas-Mazar
	Tungurahua Province	Fondo de Páramos Tungurahua y Lucha Contra la Pobreza	None
	Quito	Fondo para la Protección del Agua (FONAG)	Northeastern Cordillera Ecuador Corridor
	Zamora	Fondo Pro-Cuencas	Parque Nacional Podocarpus
	Loja and Zamora Provinces	FORAGUA	Tumbes-Loja Dry Forests Corridor, Parque Nacional Podocarpus
Peru	Lima	Aquafondo	None
Venezuela	Merida	Fondo de Agua	Venezuelan Andes Corridor

In 2011, the Latin American Water Funds Partnership (supported by The Nature Conservancy, IDB, GEF and the FEMSA Foundation) committed to developing 32 new water funds over five years with $27 million to restore more than 7 million acres of watersheds (LAWFP 2014). As of March 2014, 12 water funds were operating, 16 were in design, and 15 more areas were being evaluated for future water funds in Latin America.

USAID provided $200,000 to support the Quito Water Fund to reduce emissions from deforestation and degradation of landscapes in critical watersheds in Ecuador. Three investments from the MacArthur Foundation supported grassroots organizations and communities to link economic incentives to protect biodiversity and promote sustainable development in priority watersheds ($276,200). Among national governments, the government of Colombia re-invested parts of the tariffs from water users into watershed protection in protected areas ($297,000).

10.4 Sources of Investment

As Figure 10.3 shows, multilateral donors comprised the largest source of financing for natural resources management in the Tropical Andes, providing nearly 42 percent of total investment, followed by bilateral agencies, and national governments. Foundations, NGOs and the private sector comprised the smallest source of resource management funding at 3 percent. As Table 10.4 shows, 57 percent of all natural resources management funding supported national level programs, while 43 percent supported hotspot-based programs and projects.

Figure 10.3. Natural Resources Management Investment by Funding Source, 2009-2013

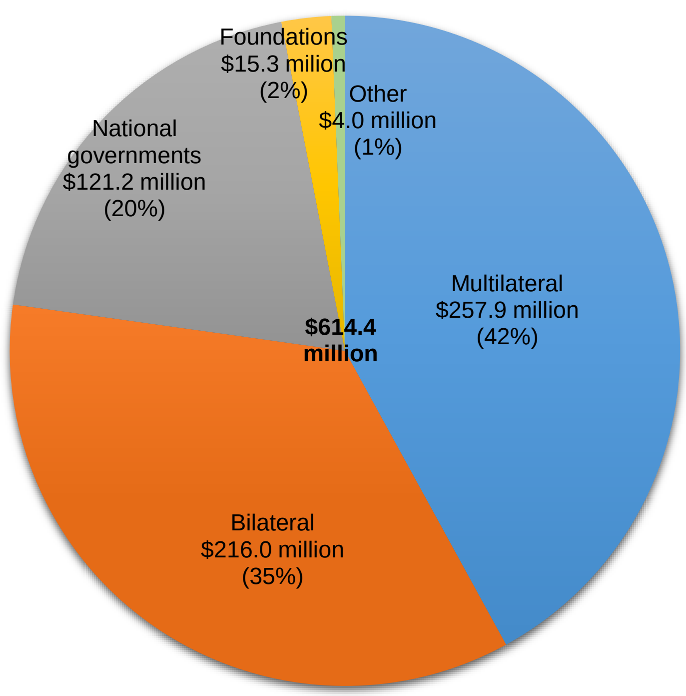


Table 10.4. Natural Resource Management Investment in the Tropical Andes Hotspot by Major Funding Source, 2009-2013

Source of investment	Total investment ($ millions)	Geographic focus of investment ($million, %)	
		National-level programs	Hotspot-based programs and projects
Multilateral donors	257.9	103.2 (40%)	154.7 (60%)
Bilateral agencies	216.0	127.4 (59%)	88.6 (41%)
National government	121.2	116.3 (96%)	4.8 (4%)
Foundations	15.3	1.4 (9%)	13.9 (91%)
Other	4.0	0.3 (8%)	3.7 (92%)
Total	**614.4**	**348.6 (57%)**	**265.7 (43%)**

Sources: CEPF 2014, EU 2014, FAO 2014, GEF 2014, GEF SGP 2014, IDB 2014, IFAD 2014, ITTO 2014, NDF 2014, UN-REDD 2014, UNDP 2014, UNEP 2014, and World Bank 2014.

10.4.1 Multilateral Donors

Multilateral donations totaled $257.9 million, with contributions by the GEF, the EU, the IDB, the World Bank, the GEF Small Grants Programme (GEF SGP), CEPF, the United Nations REDD Program (UN-REDD), the United Nations Development Program (UNDP), the Nordic Development Fund (NDF), the International Tropical Timber Organization (ITTO), the Food and Agricultural Organization (FAO), and the United Nations Environment Program. (See Table 10.4).

The GEF and the EU together accounted for 77 percent of all multilateral funding. The GEF was the largest multilateral donor, comprising 64 percent of total multilateral funding, for 32 projects. With an average investment of $5.2 million per project, GEF projects were mainly landscape and national-level initiatives focusing on numerous themes, including protected area management, watershed conservation, sustainable management of species and forest resources, and climate change, as well as planning and policy development and support (see Table 10.5).

Looking ahead, the GEF will continue to be an important source of funding for natural resources management for the period of 2014 to 2017. GEF allocations have been approved for projects in Argentina, Colombia and Ecuador with a focus on protected areas and landscape conservation, mainstreaming sustainable use of natural resources in production landscapes as a way of conserving biodiversity and guaranteeing ecosystem services. Although most projects aim to improve the status of globally endangered wildlife through landscape approaches, one project will focus specifically on the conservation of amphibians in Ecuador. The GEF portfolio also includes two projects of regional scope in Peru and Ecuador, one addressing climate change on high Andean ecosystems and the other on transboundary integrated water management. The GEF and World Bank will also support a CONAF project that includes mainstreaming biodiversity into national policies in Chile (World Bank 2013).

Climate change will continue to be on the agenda of the GEF and World Bank in the future. The proposed project “Andes Adaptation to the Impact of Climate Change in Water Resources” will build on a previous GEF/World Bank regional project to develop adaptation strategies for changing hydrological cycles in Bolivia, Ecuador and Peru (World Bank 2012). The proposed project will support climate change adaptation within the hydrological cycle, linking conservation of critical ecosystems and livelihoods.

The EU was the second-largest multilateral donor after the GEF, with a total investment of $33.9 million (13 percent of total multilateral funding) in 18 projects. EU projects focused mainly on climate change, sustainable use of natural resources and protected area management.

The IDB was the third-largest multilateral donor, with a total investment of $22.1 million (9 percent of total multilateral funding) in 26 projects, with an average project investment of $848,200. Similar to GEF projects, IDB investments were large-scale projects focused mainly on climate change, planning, policy and institutional strengthening, as well as biodiversity research and environmental monitoring, among others.

The World Bank was the fourth-largest multilateral donor with a total investment of $20.7 million in six projects. These projects focused on watershed conservation, climate change, sustainable use of natural resources and capacity building.

The GEF SGP accounted for 2 percent of multilateral funding, with a total investment of $5.5 million in 142 projects, and an average $38,900 investment per project. Projects were mainly local and community-level projects and focused primarily on capacity building as well as community development and local governance initiatives, particularly sustainable development and natural resource management activities to support rural communities and their rural livelihoods.

The CEPF provided a total investment of $4.2 million (2 percent of total multilateral funding) in 14 projects that focused on landscape conservation, biological corridors, community development and local governance, sustainable use of natural resources, protected area management and economic incentives for conservation in Bolivia and Peru (CEPF 2014).

The UN-REDD program invested $3.5 million in the two national UN-REDD programs of Bolivia and Ecuador. The remaining six multilateral donors: UNDP ($838,700), NDF ($687,800), ITTO ($607,100), FAO ($455,000), and UNEP ($249,500) contributed $2.8 million combined in projects that focused on sustainable use of natural resources, watershed conservation, community development and local governance, among others.

Table 10.5. Natural Resources Management Investment in the Tropical Andes Hotspot by Multilateral Agencies, 2009-2013

Donor	Main Countries of Intervention (# of Investments)	Main Areas of Intervention	Estimated Total Investment 2009-2013 ($)
GEF	Colombia (11) Peru (8) Ecuador (5) Argentina (2) Bolivia (2)	Seven projects focused on landscape conservation and biological corridors, including promoting sustainable land management in Las Bambas, Peru, the mainstreaming of biodiversity in sustainable cattle ranching in Colombia and the mainstreaming of biodiversity in palm cropping in	165.2 million

Donor	Main Countries of Intervention (# of Investments)	Main Areas of Intervention	Estimated Total Investment 2009-2013 ($)
	Hotspot-wide (2) Venezuela (1)	Colombia with an ecosystem approach, biodiversity conservation in the productive landscape of the Venezuelan Andes and the sustainable management of biodiversity and water resources in the Ibarra-San Lorenzo Corridor in Ecuador. Nine projects focused on protected area management, including providing funding to the Colombian National Protected Areas Conservation Trust Fund, the sustainable management of protected areas and forests in the northern highlands of Peru, the strengthening of biodiversity conservation through the National Protected Areas Program in Peru and the sustainable financing of Ecuador's National System of Protected Areas (SNAP).	
EU	Bolivia (8) Colombia (5) Ecuador (4) Regional (1)	One large project focused on community development and local governance in the watershed of Lago Poopó in Bolivia. One project supported the protection of watersheds in Bolivia nationally. Two projects focused on protected area management, one of which supported the sustainable conservation of biodiversity (PACSBIO) in Bolivia. One project focused on studying sustainable livelihoods and the use of ecosystem services in the Páramos of Colombia.	33.9 million
IDB	Colombia (9) Peru (8) Bolivia (7) Regional (2)	One project focused on the sustainable management of natural resources, including the sustainable management of highland ecosystems in North Potosi, Bolivia, among others. Three projects focused on landscape conservation and biological corridors, including environmental management of the Misicuni watershed, Bolivia, among others. Three projects focused on planning, policy and institutional strengthening, including the National Environmental System Support Program in Colombia. Two large regional projects focused on terraces recuperation and on climate change and biodiversity information in the hotspot.	22.1 million
World Bank	Colombia (3) Bolivia (2) Ecuador (1)	One large project focused on watershed conservation, specifically on integrated basin management to enhance climate resilience in Bolivia. Another large project is the San Nicholas CDM reforestation project in Colombia.	20.7 million
GEF SGP	Ecuador (53) Peru (44) Bolivia (40) Argentina (5)	Investments focused on financial and technical support to projects that conserve and restore the environment while enhancing people's well-being and livelihoods at the local level.	5.5 million
CEPF	Ecuador (4) Peru (4) Bolivia (3) Colombia (2)	Seven projects focused on landscape conservation and biological corridors, including the mitigation of potential environmental and social impacts generated by the Northern Corridor Road Construction Project in Bolivia, the consolidation of the management of the Cotacachi-Cayapas and Manglares Cayapas Mataje ecological reserves in Northwest Ecuador, among others. Two projects focused on community development and local governance, one of which supported territorial consolidation of communal, protected and indigenous lands for biodiversity conservation and sustainable development in Northwest Ecuador and Southwest Colombia. One project focused on strengthening the connectivity along Peru's Inter-Oceanic Highway in Madre de Dios through the sustainable use of natural resources and economic development (FONDAM). Another project	4.2 million

Donor	Main Countries of Intervention (# of Investments)	Main Areas of Intervention	Estimated Total Investment 2009-2013 ($)
		focused on strengthening the management and financial sustainability of key protected areas along the Southern Inter-Oceanic Highway in Madre de Dios, Peru.	
UN-REDD	Bolivia (1) Ecuador (1)	The two projects are the UN-REDD programs for both Bolivia and Ecuador.	3.5 million
UNDP	Bolivia (2) Peru (2) Argentina (1) Colombia (1)	One project focused on the integrated and adaptive management of natural resources in Peru. Smaller projects included supporting REDD+ in Peru and developing mitigation action plans and scenarios in Colombia, among others.	838,700
NDF	Bolivia (1)	One project focused on adapting to climate change in Bolivian Andean communities who depend on tropical glaciers.	687,800
ITTO	Colombia (3) Peru (2) Ecuador (1)	One project focused on integrating sustainable livelihoods and science-based reforestation for tangible forest conservation change in the Ecuadorian Chocó, among others.	607,100
FAO	Colombia (3) Regional (1)	One project focused on the participatory management and sustainable development in the hotspot, among others.	455,000
UNEP	Peru (1)	One project focused on ecosystem-based adaptation in high elevation ecosystems in the hotspot.	249,500
IFAD	Bolivia (1)	One project focused on capacity building, particularly on learning ways of adaptation, mitigation, and how to modify attitudes towards climate change in Bolivia.	No data
CAF	Peru (1)	One project focused on strengthening environmental and social management of indirect impacts of the Southern Interoceanic Highway (Interoceánica Sur).	No data
Total			**257.9 million**

10.4.2 Bilateral Donors

Bilateral agencies comprised the second largest source of conservation investment, with a total investment of $216 million from 14 bilateral donors: the United States, Germany, Japan, Switzerland, Belgium, Denmark, Finland, the United Kingdom (UK), the Netherlands, Canada, Australia, Norway, France and Spain (Table 10.6) (Governments of Australia, Belgium, Canada, Denmark, the EU, Finland, France, Germany, Netherlands, Norway, Japan, Spain, Switzerland, the UK and the US 2014).

USAID, the United States Fish and Wildlife Service (USFWS), the United States Department of State (USDoS) and the United States Forest Service (USFS) invested $92 million in 74 projects. The largest of these were REDD+ programs in Ecuador, Colombia and Peru ($6.9 million) as well as the regional Initiative for Conservation in the Andean Amazon (ICAA) ($25.2 million), which also supported REDD+ activities. USAID has closed its programs in Venezuela and Bolivia, and is in the process of shutting down its operations in Ecuador as a result of strained political relations between these countries and the United States.

Germany's *Kreditanstalt für Wiederaufbau* (KfW), *Gesellschaft für Internationale Zusammenarbeit* (GIZ) and the *Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung* (BMZ) invested $59.6 million in 25 projects, with an emphasis over the last two to three years on supporting national REDD+ systems in Ecuador and Peru ($13 million), as well as protected area management initiatives in Ecuador, Peru and Bolivia ($14.1 million).

The Japan International Cooperation Agency (JICA) provided $25.2 million to four projects. The largest of these supported the National Forest Conservation Programme for mitigation against climate change in Peru ($14.4 million).

The Swiss Agency for Development and Cooperation (SDC) provided $17.1 million for six projects, the largest three of which supported climate change initiatives ($14.3 million). One project supported a water footprint project in Peru and Chile ($1.6 million) and another supported an information and monitoring system for the Andean ecosystem (CIMA) ($1.1 million).

The Belgian Development Agency (BTC) invested $10.3 million in the hotspot for two projects, both of which supported the strategic and sustainable development of natural resources in Ayacucho, Huancavelica, Apurímac, Junín and Pasco in Peru (PRODERN I and II).

The Danish International Development Agency (DANIDA) invested $8.3 million in 12 projects. Three of these supported the sustainable development of natural resources, particularly for the Bolivian National Protected Area Service (SERNAP) ($5.4 million). Reflecting the emphasis of Nordic countries' ODA on the least developed countries, these investments were focused on Bolivia, the only hotspot country not considered a middle-income country.

Finland's Department for International Development Cooperation (FORMIN) provided $2.2 million towards six projects. The largest of these supported sustainable development of local communities and biodiversity conservation in the Nanay-Pucacuro Corridor in Peru.

The remaining seven bilateral donors, the UK's Department for International Development (DFID), the Netherlands, Canada, Australia, the Norwegian Agency for Development Cooperation (NORAD), France and the Spanish Agency for International Development Cooperation (AECID), provided a total investment of $5.1 million. As this ecosystem profile was being finalized, the governments of Norway and Peru were signing a $300 million forest conservation agreement as part of a broader climate change mitigation project.

Table 10.6. Overview of Natural Resources Management Investment in the Tropical Andes Hotspot by Bilateral Agencies, 2009-2013

Donor	Main regions of intervention (# of investments)	Main areas of intervention	Estimated total investment 2009-2013 ($)
US (USAID USFWS USDoS USFS)	Bolivia (1) Colombia (17) Ecuador (10) Peru (32) Regional (11)	Four projects supported USAID's regional Initiative for Conservation in the Andean Amazon (ICAA) and its Support Unit to assist in REDD+ activities. Five projects supported national REDD+ activities in Colombia, Peru and Ecuador. Two large projects supported Peru's Forest Sector Initiative to strengthen institutions, promote transparency, participation and access to information, and track and verify the legal origins of timber. Three projects were debt-for-nature swaps in Peru and Colombia through the US Tropical Forest Conservation Act (TFCA).	92 million
Germany (KfW GIZ BMZ)	Bolivia (4) Colombia (5) Ecuador (3) Peru (12) Regional (1)	Six projects supported REDD+ activities in Ecuador, Peru and Colombia. Three projects supported climate change adaptation, including ecosystem based adaptation in mountain ecosystems in Peru and adaptation across the hotspot. Two projects supported the sustainable use of natural resources, including the Sustainable Natural Resources Management Programme (GESOREN) in Ecuador, among others. Three projects supported planning, policy and institutional strengthening, including Environmental Policy and Sustainable Management of Natural Resources (PROMAC) in Colombia, among others. Six projects supported protected area management, including the Protected Areas Programme in Ecuador, the management of nature conservation areas and their buffer zones in Bolivia, the effective management of natural protected areas in Peru and support towards the National Protected Areas Programme (PRONANP) in Peru.	59.6 million
Japan (JICA)	Bolivia (2) Peru (2)	Four projects supported climate change adaptation and mitigation activities, including the National Forest Conservation Programme for mitigation against climate change in Peru, the Forest Preservation Programmes in Bolivia and Peru, and a study on the impact of glacier retreat in Bolivia.	25.2 million
Switzerland (SDC)	Regional (4) Peru (2)	Three projects supported climate change adaptation and mitigation activities, including a nationally appropriated adaptation and mitigation forest action plan for the Andean region and climate change adaptation in Peru (PACC). One project was a water footprint project in Peru and Chile. Another project supported an information and monitoring system for the Andean ecosystem (CIMA).	17.1 million
Belgium (BTC)	Peru (2)	Two projects supported the sustainable management of species and forest resources, including the strategic and sustainable development of natural resources in Ayacucho, Huancavelica, Apurímac, Junín and Pasco in Peru (PRODERN I and II).	10.3 million
Denmark (DANIDA)	Bolivia (11) Regional (1)	Four projects supported watershed conservation in Bolivia, encouraged civil society participation, promoted sustainable development, and supported the Bolivian National Protected Area Service (SERNAP).	8.3 million
Finland (FORMIN)	Peru (4) Colombia (1) Ecuador (1)	One project supported biodiversity conservation in the Nanay-Pucacuro Corridor. One project supported community development and local governance in Peru. Two projects supported REDD+ activities in Colombia and Ecuador.	2.2 million

Donor	Main regions of intervention (# of investments)	Main areas of intervention	Estimated total investment 2009-2013 ($)
UK (DFID)	Regional (2) Colombia (1) Ecuador (1)	Two projects supported climate change, including assessing Quito's vulnerability to climate change and carbon and water footprinting in La Paz, Lima and Quito.	800,200
Netherlands	Colombia (1)	One project supported REDD+ activities in Colombia.	153,100
Canada	Ecuador (1)	One project supported the integration and consultation of sustainable development projects in Chimborazo.	110,900
Australia	Ecuador (1)	One project supported Ecuador's context-assessment and proposal to support the National Climate Change Capacity Building Programme.	98,600
Norway (NORAD)	Colombia (1)	One project supported REDD+ activities in Colombia.	13,500
France	Colombia (1)	One project supported REDD+ activities in Colombia.	7,400
Spain (AECID)	Peru (1)	One project supported climate change adaptation and mitigation activities in Peru.	-
Total			**215.88 million**

10.4.3 National Governments

National government expenditures comprised the third largest source of resource management investments in the hotspot, with a total investment of $121.2 million among Colombia, Peru, Ecuador and Bolivia (Table 10.7) (Governments of Bolivia, Colombia, Ecuador and Peru 2014). These investments consisted mainly of national-level projects that did not specifically target the hotspot, but nevertheless contained a significant portion of the hotspot in their scope.

The Peruvian government invested $55.4 million in 12 projects. The largest of these were support of the National Protected Areas Service (SERNANP) ($24.6 million) and the protection of flora and fauna ($23.7 million). Another project specifically targeted the hotspot in the region of Ayacucho to support sustainable development of agroforestry and non-timber forest products ($3.1 million).

The government of Colombia provided $47.2 million in conservation investments for 95 projects. The largest of these was the management of the National Parks System (SINAP) ($33.2 million). Another project supported the integrated management of biodiversity and its ecosystem services ($1.9 million). Numerous other projects supported policy and planning, particularly updating current conservation policy ($4.9 million) and initiatives for the management and restoration of ecosystems ($5 million). Two small projects focused specifically on the hotspot, one on the conservation and sustainable use of biodiversity ($59,500), and the other on the recuperation and protection of degraded areas in the Ubate-Suarez watershed ($39,700).

The Ecuadorian government provided $13.3 million for 20 projects. The largest supported economic incentives for conservation through the Socio Bosque forest conservation program ($7.7 million, see Chapter 6 for description) and support of the National System of Protected Areas (SNAP) ($2.3 million). Four projects specifically targeted the hotspot, two of which supported climate change adaptation measures ($65,000), one that facilitated the community and sustainable development activities in the Andean region ($48,600), and one that supported management of the Colambo Yacuri protected area ($96,600).

The government of Bolivia invested a total $5.4 million in nine projects. The largest of these supported the management of national protected areas (SERNAP) ($2.1 million) and the sustainable management of species and forest resources ($2.1 million). Two investments specifically targeted the hotspot, both of which supported the conservation and sustainable use of Andean ecosystems ($1.1 million).

Table 10.7. Natural Resources Management Investment in the Tropical Andes Hotspot by National Governments, 2009-2013

Donor	Main Regions of Intervention (# of Investments)	Main Areas of Intervention	Estimated Total Investment 2009-2013 ($)
Peru	National (10) Hotspot-Specific (2)	Five projects supported the National Protected Areas Service (SERNANP). Three projects supported landscape conservation, including protection of flora and fauna and the management of biodiversity. One project supported community development and local governance of agroforestry and non-timber forest products in Ayacucho.	55.4 million
Colombia	National (92) Hotspot-Specific (3)	49 projects supported planning, policy and institutional strengthening including updating national conservation policy. Five projects supported the management of the National Parks System (SINAP). Twelve projects supported biodiversity research and environmental monitoring activities, including improving the national information system of biodiversity. Eleven projects supported the sustainable management of forests and other natural resources, including the management and restoration of ecosystems.	47.2 million
Ecuador	National (17) Hotspot-specific (3)	Four projects provided economic incentives for conservation through the Socio Bosque forest conservation program. Eight projects supported climate change adaptation and mitigation activities, including adapting to climate change through effective water governance. One project supported the administration of biodiversity and another focused on an environmental information monitoring system. One project supported the National System of Protected Areas (SNAP).	13.3 million
Bolivia	National (7) Hotspot-specific (2)	Three projects supported protected area management, specifically the management of national protected areas (SERNAP). Three projects funded the sustainable management of forests and other natural resources, including the conservation and sustainable use of vertical Andean ecosystems. One project focused on the landscape conservation of vertical Andean ecosystems. Twoinvestments supported pilot projects on climate resilience.	5.4 million
Total			**121.3 million**

10.4.4 Foundations

Foundations donated $15.3 million to 138 projects that were mostly local in scale compared to efforts supported by other funding sources and focused on capacity building and training, research and monitoring, and local governance. Foundation support provided one of the few opportunities for funding to be channeled directly to national and local NGOs. The MacArthur Foundation contributed 52 percent of total foundation investment, with the remaining 48 percent divided among the Blue Moon Fund, Gordon and Betty Moore Foundation, the Overbrook Foundation, the JRS Biodiversity Foundation, the Tinker Foundation, the John Fell Fund, the

Wallace Global Fund, the Mohamed bin Zayed Conservation Fund and the Swift Foundation Fund (Table 10.8) (Blue Moon Fund, Gordon and Betty Moore Foundation, John Fell Fund, JRS Biodiversity Foundation, MacArthur Foundation, Swift Foundation, Overbrook Foundation, Tinker, Mohamed bin Zayed Conservation Fund and Wallace Global Foundations 2014).

The MacArthur Foundation contributed $7.6 million to 30 projects. Eight projects totaling $4.4 million supported mapping and monitoring watersheds, assessing ecosystems and incorporating climate change in conservation planning. Ten projects totaling $1.7 million linked training and research to conservation practices and provided technical assistance and capacity building for local and indigenous communities affected by development projects. Since 2012, the MacArthur Foundation has specifically targeted the Tropical Andes, with an emphasis on key watersheds in Bolivia, Peru (2012), Ecuador and Colombia (2013).

The Blue Moon Fund contributed $3.8 million to 27 projects. Eight projects totaling $1.3 million supported protected area management, including strengthening Bolivia's protected area system, Ecuador's Volcan Antisana, sustainability tools for private conservation areas, indigenous protected area management with the Cofán in Ecuador, expanding the protected areas network in Peru and the sustainable management of Alto Huayabamba in Peru. Four projects totaling $600,000 supported biodiversity research and environmental monitoring, including a rapid biological and social inventory of Cerros Campanquíz in Northern Peru and a GIS system for large-scale conservation strategies. Three projects supported economic incentives for conservation, including the creation of a water-based payment for ecosystem services trust fund in Bolivia and payments for environmental services in the Ecuadorian Andes, among others.

The Gordon and Betty Moore Foundation contributed $1 million to landscape conservation in Madre de Dios, Peru (which is located mostly outside of the hotspot), $891,200 to REDD+ activities in Colombia and Ecuador, $239,000 towards an ecosystem services laboratory in the hotspot and another $216,000 to an investment database for biodiversity conservation.

The remaining seven foundations and funds—the Overbrook Foundation, the JRS Biodiversity Foundation, the Tinker Foundation, the John Fell Fund, the Wallace Global Fund, the Mohammed bin Zayed Conservation Fund and the Swift Foundation—provided a combined $1.6 million to watershed conservation, protected area management, community development and local governance, biodiversity research and environmental monitoring, species conservation, economic incentives for conservation and capacity building, among others. Other foundations working in the region are Save our Species and AVINA, the latter not directly supporting biodiversity conservation.

Table 10.8. Natural Resources Management Investment in the Tropical Andes Hotspot by Foundations, 2009-2013

Donor	Main Regions of Intervention (# of investments)	Main Areas of Intervention	Estimated Total Investment 2009-2013 ($)
MacArthur Foundation	Regional (21) Peru (6) Bolivia (1) Colombia (1)	Eight projects supported biodiversity research and environmental monitoring, including mapping and monitoring watersheds in the hotspot using high-resolution remote measurement and modeling methods	7.6 million

Donor	Main Regions of Intervention (# of investments)	Main Areas of Intervention	Estimated Total Investment 2009-2013 ($)
	Ecuador (1)	in support of conservation investments and outcome assessments, developing a standard methodology to estimate climate change risk for biodiversity at local scales in the hotspot, and assessing research and institutional needs to cope with the effects of climate change on Andean biodiversity. Ten projects supported capacity building, including building economic skills to sustain conservation in the Southern Tropical Andes and to support cross-border networking and leadership training for protection of indigenous territories in the Northern Tropical Andes. Four projects supported climate change mitigation and adaptation activities, including determining climate change impacts on biodiversity in the tropical Andes, climate risks, vulnerability and decision making tools for the planning of conservation.	
Blue Moon Fund	Regional (9) Peru (8) Bolivia (7) Ecuador (3)	Eight projects supported protected area management, including strengthening Bolivia's protected area system, Ecuador's Volcan Antisana, sustainability tools for private conservation areas, indigenous protected area management with the Cofán in Ecuador, expanding the protected areas network in Peru and the sustainable management of Alto Huayabamba in Peru. Four projects supported biodiversity research and environmental monitoring, including a rapid biological and social inventory of Cerros Campanquíz in Northern Peru and a GIS system for large-scale conservation strategies. Three projects supported economic incentives for conservation, including the creation of a water-based payment for ecosystem services trust fund in Bolivia and payments for environmental services in the Ecuadorian Andes, among others.	3.8 million
Moore Foundation	Peru (2) Colombia (1) Ecuador (1) Regional (1)	Two projects supported biodiversity research and environmental monitoring, including building an ecosystem services laboratory in the hotspot and an investment database for biodiversity conservation in the Andes-Amazon region.Two projects supported REDD+ activities in Colombia and Ecuador. One project supported the consolidation of the Manu-Tambopata Conservation Corridor to mitigate forest conversion in Madre de Dios, Peru.	2.3 million
Mohamed bin Zayed Conservation Fund	Venezuela (2) Colombia (21) Ecuador (6) Peru (23) Bolivia (7) Chile (2) Argentina (1)	62 projects for the conservation of threatened species.	573,000
Overbrook Foundation	Ecuador (2)	One project supported the creation of reciprocal agreements for watershed conservation in Southern Sangay National Park, Ecuador. Another project supported a conservation fund for the establishment and management of protected areas by municipal governments in southern Ecuador.	285,000
JRS Biodiversity Foundation	Colombia (3) Bolivia (1) Peru (1)	Five projects supported biodiversity research and environmental monitoring, including the creation of Internet databases for páramo plants and Colombian	252,400

Donor	Main Regions of Intervention (# of investments)	Main Areas of Intervention	Estimated Total Investment 2009-2013 ($)
		flora, support to the Geospatial Center for Biodiversity, and enhancement of access to Peruvian plant specimens through herbarium digitization.	
Tinker Foundation	Ecuador (1)	One project supported the extension of watershed protection in the Ecuadorian Andes (FORAGUA).	237,000
John Fell Fund	Regional (1)	One project supported modelling cloud forest-climate interactions in the hotspot.	119,800
Wallace Global Fund	Regional (1)	One project addressed the environmental and human rights impacts of mining in the Northern Tropical Andes.	40,000
Save our Species	Ecuador (1)	One project supported the conservation of threatened species.	40,000
Swift Foundation	Colombia (1) Ecuador (1) Peru (1)	One project provided technical assistance to prevent adverse resource extraction and environmental impacts on indigenous people and biodiversity.	21,900
Total			**15.69 million**

10.4.5 Other Donors

The remaining 1 percent of total conservation investment in the hotspot came from other sources, including private companies and NGOs (Table 10.9) (Amazon Conservation Association, EcoFondo, Forest Trends, Odebrecht, Pluspetrol, RedLAC, The Nature Conservancy, Walt Disney and Wildlife Conservation Society 2014). The largest of these consisted of the Walt Disney Company's $3.5 million purchase of REDD credits in Alto Mayo, Peru.

Table 10.9. Natural Resources Management Investment in the Tropical Andes Hotspot by Other Sources, 2009-2013

Donor	Main Regions of Intervention (# of Investments)	Main Areas of Intervention	Estimated Total Investment 2009-2013 ($)
Walt Disney Company	Peru (2)	One project consisted of the purchase of REDD credits in Alto Mayo, Peru. Another project supported the reassessment of the status of endangered and vulnerable species of frogs in the hotspot after an epidemic of a fungus.	3.5 million
Confidential	Ecuador (1)	One project supported REDD+ activities in Ecuador.	113,100
Cargill	Colombia (1)	One project supported REDD+ activities in Colombia.	102,600
RedLAC	Peru (1)	One project supported the payment for environmental services provided by water resources from Salinas y Aguada Blanca National Reserve in Arequipa, Peru.	100,000
Cerrejon	Colombia (1)	One project supported REDD+ activities in Colombia.	35,900
J.P. Morgan	Colombia (1)	One project supported REDD+ activities in Colombia.	27,000
Face the Future	Ecuador (1)	One project supported REDD+ activities in Ecuador.	20,700
CCX	Colombia (1)	One project supported REDD+ activities in Colombia.	10,900
Total			**3.91 million**

10.5 Summaries of Investment by Country

Over half (51 percent) of all conservation investment in the hotspot between 2009 and 2013 was shared by Peru (32 percent) and Bolivia (19 percent), with the remaining five hotspot countries—Colombia (18 percent), Ecuador (13 percent), Venezuela (4 percent), Argentina (0.2 percent) and Chile (0 percent)—receiving 35 percent combined (Table 10.10, Figures 10.4 and 10.5). Regional or multi-country investments of $82.9 million in conservation activities were made during this period, comprising the remaining 15 percent of total investment. The largest recipients—Peru, Bolivia, Colombia and Ecuador—are also the countries with the largest share of the hotspot within their boundaries.

Table 10.10. Overview of Natural Resource Management Investment in the Tropical Andes Hotspot by Country, 2009-2013

Country/Region	Total Investment ($ millions)	Geographic Focus ($million, %) National-Level Programs	Geographic Focus ($million, %) Hotspot-Based Programs and Projects
Peru	$203.7	132.4 (65%)	71.3 (35%)
Colombia	$131.2	103.1 (79%)	28.0 (21%)
Bolivia	$102.2	53.1 (52%)	49.1 (48%)
Regional	$82.9	0 (0%)	82.9 (100%)
Ecuador	$73.2	59.3 (81%)	13.9 (19%)
Venezuela	$20.2	0 (0%)	20.2 (100%)
Argentina	$1.0	0 (0%)	1.0 (100%)
Chile	-	0 (0%)	0(0%)
Total	**$614.4 million**	**347.1 (57%)**	**264.2 (43%)**

Figure 10.4. Investments for Natural Resources Management by Country, 2009-2013

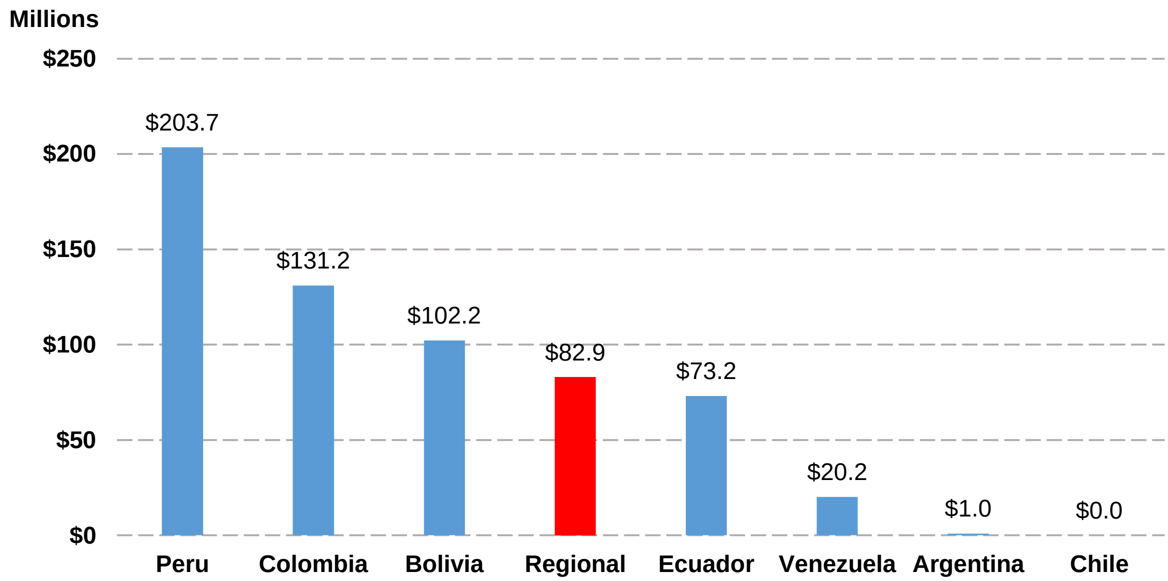
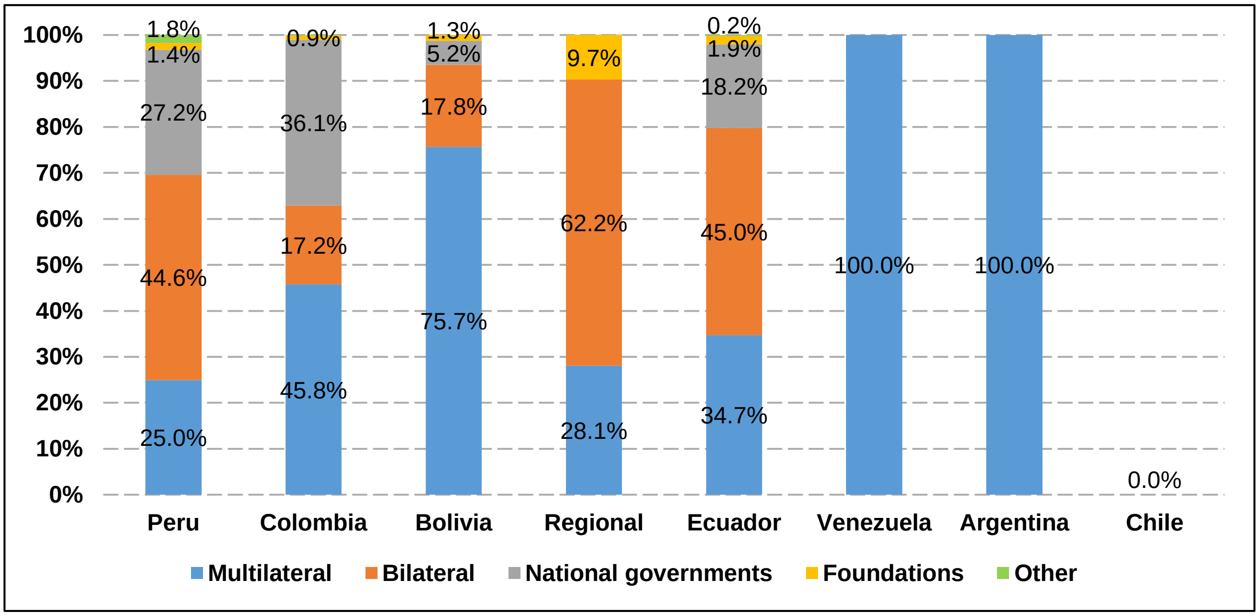


Figure 10.5. Share (%) of Total Hotspot Investment for Natural Resources Management by Source and Country, 2009-2013



10.5.1 Argentina

Resource management investments in Argentina totaled $990,100 in the hotspot for 10 projects. The largest project supported *in-situ* conservation of Andean crops and their wild relatives in Jujuy Province and was funded by GEF for $633,900. Five investments originated from GEF's Small Grants Programme and focused exclusively on community development and local governance, particularly supporting the production of non-timber forest products and agroforestry ($240,200). One large national-level investment was provided by GEF for biodiversity conservation in productive forestry landscapes. However, this national-level investment was not included in total conservation investment because the amount of the country located in the hotspot does not exceed the 20 percent threshold.

10.5.2 Bolivia

Resource management investments in Bolivia totaled $102.2 million for 105 projects. The largest projects were funded by the EU, World Bank, GEF and IDB. Among these, the EU supported community development and local governance in the watershed of Lago Poopó in Bolivia ($14.6 million), the national plan for watersheds ($6.9 million) and the sustainable conservation of biodiversity in the national protected areas (PAPSBIO) ($6.6 million). The World Bank supported integrated basin management to enhance climate resilience in Bolivia ($13.2 million). Of two GEF projects, one focused on biodiversity conservation through sustainable forest management by local communities in Madidi ($4.3 million), and the other on conservation and sustainable use of biodiversity in Andean ecosystems ($10.7 million). Two IDB projects focused on the sustainable management of highland ecosystems in the North Potosi region ($9.3 million) and on environmental management of the Misicuni Watershed, to mitigate the effects of the construction of a dam ($4 million). The UN-REDD Programme contributed $1.7 million towards the Bolivia's national REDD+ program.

The largest bilateral donors were Japan, Denmark and Germany. Japan supported the Forest Preservation Programme in Bolivia ($4.3 million) and a study on the impact of glacier retreat ($3.3 million). Denmark financed the sustainable management of natural resources to support watersheds ($3.2 million), strengthening civil society participation ($1.3 million), promoting sustainable development ($512,400), and supporting the Bolivian National Protected Area Service (SERNAP) ($1.7 million). Germany provided $2.4 million for the management of nature conservation areas and their buffer zones. The national government provided $2.1 million towards protected area management (SERNAP).

Future international funding is uncertain with Switzerland shifting its attention elsewhere, and assistance from major international donors such as USAID, Germany and the Netherlands either declining or gone. Participants at the stakeholder workshop emphasized the uncertainty of future international funding due to the departure of some donors and the government's restructuring of how it handles international cooperation. A positive note is the formation of a nine sectoral groups to coordinate international assistance, including one group dedicated to environmental funding and strengthening participation in international environmental processes.

10.5.3 Chile

One conservation investment was identified that specifically targeted only the hotspot in Chile. This project consisted of research and monitoring activities in the Bernardo O'Higgins National Park by the Wildlife Conservation Society. Some regional projects included Chile in their scope, such as the SDC's regional investment in watershed conservation in the Peruvian and Chilean Tropical Andes, worth $1.6 million. Similarly, the U.S. Department of State provided $2 million towards climate change adaptation in the Andean region to address the impact of tropical glacier retreat and reduce vulnerabilities in mountainous and glacial areas as a result of climate change, particularly targeting the Andean countries with glaciers: Chile, Colombia, Ecuador and Peru. Large national-level investments were provided by numerous multilateral donors and included creating an integrated national monitoring and assessment system on forest ecosystems and a national framework on sustainable land management to mainstream biodiversity into national policies and protect forest carbon assets. These national-level investments were not included in total conservation investment because the portion of the country in the hotspot does not exceed the 20 percent threshold.

10.5.4 Colombia

Colombia received a combined $131 million for 175 projects. The GEF supported eight large projects, including financing for the sustainability of the Macizo Regional Protected Area System ($15.1 million) and mainstreaming biodiversity in productive sectors ($16.6 million). The World Bank supported the San Nicholas Clean Development Mechanism (CDM) reforestation project in Antioquia ($6.7 million). The IDB provided $3.4 million towards the National Environmental System Support Program.

Large bilateral investments to Colombia were provided by USAID towards its REDD+ program ($2.5 million), Conservation Landscapes program ($3.1 million), and debt-for-nature swap ($1.3 million). Germany's KfW provided $6.5 million for the biodiversity conservation component of forestry as a production alternative for coffee as well as $4.1 million towards environmental policy and sustainable management of natural resources (PROMAC). Unfortunately, the specific areas targeted by this investment are not readily available. The national government funded the integrated management of biodiversity and ecosystem services ($1.9 million) as well as environmental management through the Fondo Ambiental Nacional (FAN).

10.5.5 Ecuador

Ecuador received a combined $73.1 million for 130 projects. The largest bilateral investments to Ecuador were provided by Germany, which invested $16 million to the Sustainable Natural Resources Management Programme (GESOREN), $7.1 million to support SNAP and $5.2 million to support REDD+ and the Socio Bosque Program.

The GEF was the largest multilateral donor to Ecuador, investing in the environmental management of Chimborazo's Natural Resources ($7.8 million), the sustainable financing of Ecuador's National System of Protected Areas (SNAP) ($6 million) and the sustainable management of biodiversity and water resources in the Ibarra-San Lorenzo Corridor ($3.5 million). The UN-REDD Programme contributed $1.8 million to the national REDD+ program. The national government provided $7.8 million to its Socio Bosque forest conservation program.

10.5.6 Peru

Peru was the largest recipient of conservation investments in the hotspot, having received a combined $203.5 million for 163 projects. The government of Peru invested $23.7 million to protect fauna and flora and $26.8 million in the National Protected Areas Service (SERNANP). Among multilateral agencies, the GEF funded numerous protected areas management projects ($27 million) and landscape conservation and biological corridors initiatives ($17.3 million).

Among bilateral sources, Japan provided $14.4 million to the National Forest Conservation Programme for mitigation of climate change as well as the Forest Preservation Programme ($3.2 million). Belgium provided $10.3 million to support the sustainable management of forests and other natural resources, including the strategic and sustainable development of natural resources in Ayacucho, Huancavelica, Apurímac, Junín and Pasco (PRODERN I and II). The SDC provided $6.2 million for climate adaptation project in the Peruvian Andes. USAID provided $8.6 million in debt-for-nature swaps through the TFCA as well as $7.9 million to the Peru Forest Sector Initiative (PFSI). USAID also provided $3.5 million to REDD+ activities. Germany supported the creation of a national REDD+ system in Peru ($2.3 million) as well as REDD+ in protected areas of the Amazon (MACC I and II) ($2.7 million). Germany also funded protected area management, including supporting the National Protected Areas Programme (PRONANP) ($1.6 million), the Tropical Conservation Areas Phase II ($1.5 million), and the effective management of natural protected areas (SINANPE III) ($1.6 million). Among private funding sources, the Walt Disney Company provided $3.5 million through its purchase of REDD credits in Alto Mayo, Peru.

10.5.7 Venezuela

GEF invested $20.2 million on biodiversity conservation in the productive landscape of the Venezuelan Andes, specifically the conservation of montane forest biodiversity and related ecological services in the Mérida Cordillera. The current situation of political instability and Venezuela's relatively high levels of per capita income from petroleum exports have made it a low priority for many public and private funders of conservation in recent years. Few foundations finance projects in Venezuela today. Although the MacArthur Foundation's Conservation and Strategic Development program's 2011-2020 strategic framework includes northwestern Venezuela in its focus area, the watersheds within the country were not prioritized for investment in the 2013 call for proposals in the northern Tropical Andes.

At the stakeholder consultation workshop, representatives of civil society organizations reported that their major sources of funding today are from the private sector as part of corporate responsibility initiatives and a few international donors. The actual amounts of investment are unknown because most of these donors do not publicize the value of their contributions. The difficult funding climate in Venezuela has undoubtedly contributed to the decisions made by several international environmental NGOs, including Conservation International, Wildlife Conservation Society and the World Wildlife Fund, to no longer maintain offices in the country.

10.6 Regional Environmental Initiatives

Regional conservation investments in the hotspot totaled $82.9 million for 64 projects. The largest regional program was USAID's Initiative for Conservation in the Andean Amazon (ICAA) to primarily support capacity building and policy formation in the Andies and Amazon ($25.2 million). The second-largest regional investment was provided by the GEF for adaptation to the impact of rapid glacier retreat in the hotspot ($15.9 million). The third-largest was provided by the SDC to support a nationally appropriated adaptation and mitigation forest action plan for the Andean region ($6.2 million). Other large regional conservation investments valued at more than $1 million are listed in Table 10.11 below.

Table 10.11. Large Regional Environmental Investments in the Tropical Andes Hotspot, 2009-2013

Donor	Main Regions of Intervention	Main Areas of Intervention	Estimated Total Investment 2009-2013 ($)
USAID	Bolivia, Colombia, Ecuador and Peru	Initiative for Conservation in the Andean Amazon (ICAA) to support capacity building and policy development.	25.2 million
GEF	Hotspot-wide	Adaptation to the rapid impact of glacier retreat in the hotspot.	15.9 million
Switzerland	Hotspot-wide	Nationally appropriated adaptation and mitigation forest action plan, Andean region.	6.2 million
USAID	Bolivia, Colombia, Ecuador and Peru	Understanding and managing glacial ice and water resources in hotspot in the face of projected dramatic climate change impacts.	4 million
US Department of State	Peru, Ecuador, Colombia	Reduction of net greenhouse gas (GHG) emissions from forest and land use sector in Ecuador, Colombia and Peru through strengthening forest monitoring systems in each country and supporting one demonstration project in each country that is designed to show how countries can move toward net zero deforestation (AmaZONAS Andinas).	3.8 million
GEF	Peru, Bolivia, Ecuador and Colombia	Strengthening the protection of habitats populated by species that are globally critically endangered and endangered within the terrestrial protected area networks of the hotspot countries of Peru, Bolivia, Ecuador and Colombia.	3.6 million
MacArthur	Hotspot-wide	Mapping and monitoring watersheds in the	2.8 million

Foundation		hotspot using high-resolution remote measurement and modeling methods in support of conservation investments and outcome assessments.	
Switzerland	Hotspot-wide	Climate services with an emphasis on the hotspot in supporting decision-making (CLIMANDES).	1.9 million
Switzerland	Peru and Chile	A water footprint project.	1.6 million
Germany	Hotspot-wide	Adapting to climate change in the Andean region.	1.6 million
Switzerland	Hotspot-wide	An information and monitoring system for the Andean ecosystem (CIMA).	1.1 million
U.S. Fish and Wildlife Service	Hotspot-wide	Reforestation of Critical Wintering Habitat for Neotropical Migrants.	1 million
U.S. Department of State	Chile, Colombia, Ecuador and Peru	Support adaptation work in the hotspot to address the impact of tropical glacier retreat in mountainous and glacial areas as a result of climate change.	1 million
U.S. Department of State	Chile, Colombia, Ecuador and Peru	Strategies to understand and reduce their vulnerabilities to the impacts of climate change.	1 million
EU	Colombia, Ecuador and Peru	Conservation and local sustainable development in the Cordillera Real Oriental.	1 million
15 large projects (>$1M)			**71.7 million**
49 small projects (<$1M)			**11.2 million**
Total			**82.9 million**

10.7 Gap and Opportunity Analysis

10.7.1 Geographic Funding Gaps

Investments for natural resources management were unevenly distributed across the seven Tropical Andes countries when measured as a ratio of the amount of funding invested in a country against its area lying inside the hotspot. Ecuador received the highest share of funding proportional to the area lying in the hotspot with a ratio of 1:1.6, followed by Peru (1:1.2) and Colombia (1:1.1). Venezuela (1:0.9), Bolivia (1:0.7), Argentina (1:0.0), and Chile (1:0.0) received less funding than their share of the hotspot. As Table 10.12 shows, funding across the 29 corridors described in Chapter 4 was also highly variable.[14] The analysis shows major differences in funding allocations, with 13 of the 29 corridors, equaling 45 percent of the total, having no funding identified. Of the remaining 55 percent of the corridors with identified investments, eight corridors received over $1 million and another eight received less than $1 million over the five year period examined. Peru's Northeast Corridor received the most funding with $21 million.

Table 10.12. Natural Resources Management Investment in Corridors within the Tropical Andes Hotspot 2009-2013

[14] Detecting funding gaps at a finer scale beyond individual countries is challenged by a general lack of site-level budgeting data in donor and government reporting, making the disaggregation of budgets at KBA level highly inconsistent. As a result, the values in Table 10.12 can be considered a subset of all investments. Grants invested in multiple corridors were assigned proportionately to each recipient corridor.

Corridor	Country	Number of Grants	Total Investment ($)	Investment per ha of KBA Area ($)	Donors
Tucuman Yungas	Argentina	0	0	0	--
Tarija-Jujuy	Argentina/Bolivia	0	0	0	--
Madidi-Pilón Lajas-Cotapata	Bolivia/Peru	5	979,000	0.16	CEPF, MacArthur, GEF SGP
Isiboro-Amboro	Bolivia	2	133,000	0.04	CEPF, GEF SGP
Chilean / Bolivian Altiplano Saline Lakes	Bolivia/Chile	1	300,000	0.04	MacArthur
Trinational Puna	Chile/Argentina/ Bolivia	0	0	0	--
Northeast Cordillera	Colombia	2	3,967,000	1.43	EU
Bogota Eastern Cordillera	Colombia	0	0	0	--
South Central Cordillera	Colombia	2	4,200,000	2.56	GEF, MacArthur
La Bonita-Churumbelos	Colombia	1	75,000	0.05	USFWS
Northeast of Quindio	Colombia	0	0	0	--
Sonson-Nechi	Colombia	0	0	0	--
Páramo de Urrao-Tatama	Colombia	1	200,000	0.21	CEPF
Paraguas-Munchique	Colombia	1	915,000	0.61	EU
Sierra Nevada de Santa Marta National Natural Park and surrounding areas	Colombia	0	0	0	--
Cotacachi-Awa	Colombia/Ecuador	8	4,359,000	3.11	CEPF, GEF, GEF SGP, MacArthur
Northwestern Pichincha	Ecuador	3	675,000	0.81	GEF SGP, MacArthur
Northeastern Cordillera Ecuador	Ecuador	4	4,203,000	3.47	GEF, GEF SGP, Overbrook
Cotopaxi-Amaluza	Ecuador	0	0	0	--
Western Azuay	Ecuador	0	0	0	--
Condor-Kutuku-Palanda	Ecuador/Peru	2	180,000	0.10	GEF SGP, Overbrook
Tumbes-Loja Dry Forests	Ecuador/Peru	0	0	0	--
Northeastern Peru	Peru	6	21,030,000	4.41	Disney, GEF, Germany, NORAD, USAID
Carpish-Yanachaga	Peru	3	8,103,000	7.30	Germany, USAID
Lima-Junin Highlands	Peru	0	0	0	--
Cordillera de Vilcanota	Peru	2	1,093,000	0.52	GEF, CEPF
Venezuelan Andes	Venezuela	1	7,352,000	2.29	GEF
Perija Cordillera	Venezuela/Colombia	0	0	0	--
Cordillera de la Costa Central	Venezuela	0	0	0	--

Funding directed at specific species outcomes was limited, as discussed above. Funding was mainly directed at the conservation of migratory birds, specific endangered birds and amphibians. There were major gaps in funding specifically for plants, fish, reptiles and mammals. A lack of IUCN Red List assessments for plants, fish and reptiles may restrict investments in these groups because some donor agencies (*e.g.*, Save Our Species, USFWS in some cases, and the Mohamed bin Zayed Species Conservation Fund) require that a species be listed in a threatened category to be eligible for funding. There was a surprising lack of funding for charismatic mammals such as bears or tapirs, or even uncharismatic bats or rodents. Conservation efforts for these species, where they exist, was apparently locally funded. Although limited funding was available for amphibian conservation, it was clearly not sufficient, particularly in light of the high numbers of threatened amphibians, many on the brink of extinction. The current levels of support need to be substantially increased to bring about significant protection for amphibians.

10.7.2 Thematic Gaps and Opportunities

Despite the fact that protected areas are receiving what appear to be increasing allocations of government funding in many countries, these resources are nevertheless thinly spread over very large and often remote areas. No country in the hotspot spends as much as $3/ha in protected areas management, and some spend far less. Generating new funding streams, financing commitment and financial mechanisms for these protected areas continues to be a significant need for all hotspot countries and virtually every KBA. Funding to safeguard the most endangered species from extinction is very small at $10.5 million from 2009 to 2013, accounting for about 3% of all total monies dedicated to biodiversity conservation, leaving highly endangered species still vulnerable to extinction.

REDD+ and climate change, the focus of nearly a quarter of investments tracked, also represents an important opportunity, as highlighted in Chapter 9. The current prominence of bilateral and multilateral support for REDD+ creates important opportunities to leverage climate funding by emphasizing synergies with biodiversity areas, as well as the possibility of leveraging private sector finance, if and when carbon markets begin to mobilize significant resources for offset projects and jurisdictional REDD+ systems. Leveraging climate change adaptation finance for biodiversity outcomes through ecosystem-based adaptation projects also has strong potential for synergies.

Although $336 million in biodiversity conservation investment went into the hotspot over the last five years, this level of finance is relatively small when compared to other sectors and to the magnitude of threats faced. Investments in agriculture, mining, transport and energy infrastructure (investment by China in mining and IIRSA in infrastructure alone runs into the hundreds of billions of dollars) are orders of magnitude greater than finance for conservation, a fact that is unlikely to change any time soon. Engaging effectively with these other sectors and leveraging modest levels of conservation funding to create change in policies and practices that favor biodiversity will be essential to success. Reducing and mitigating environmental impacts from large-scale development projects should be seen as a priority, with compensation mechanisms having the potential to mobilize additional private and public-sector funding from infrastructure and extractive industries with residual, unavoidable impacts.

Other promising objectives and activities could also benefit from increased funding:

- Economic incentives for conservation: Despite the potential of innovative conservation financing instruments and economic incentives for the protection of biodiversity, these received a relatively modest share of overall funding (1.8 percent). Chapter 6 provides an overview of a number of these incentives such as biodiversity compensation, forest compensation (Socio Bosque programs) and corporate social responsibility programs. Investments in capacity building, monitoring, stakeholder engagement and communications could play an important role in leveraging additional funds through these mechanisms.
- Biodiversity research and environmental monitoring: Although each country has witnessed numerous attempts to identify priority biodiversity conservation areas, these efforts suffer from limitations on baseline biodiversity information and received limited funding. As described in Chapter 4, there are major gaps in the availability of conservation status and digital distribution information for species. Basic inventories are lacking, especially for areas in Colombia such as the Sierra Nevada de Santa Marta and parts of all three cordilleras, which until recently were too dangerous for scientists to visit. Finally, monitoring is needed to update and expand the Red List and other data sets to show the success or failure of conservation investments.
- Capacity building: Gaps remain in investments in local NGOs that target the strengthening of capacities of domestic civil society, as highlighted in Chapter 7, with this area receiving only a small share of direct funding (though a larger share of these resources are likely to reach NGOs indirectly).
- Local governance: As described in Chapter 6, decentralization and the growing role of subnational governments represents an important shift and opportunity for involvement. Nevertheless, financial support specifically targeted at the decentralization of conservation management and the integration of local stakeholders into sustainable development management and decision is lacking.

11. CEPF NICHE FOR INVESTMENT

The preceding chapters provide a foundation for the biological, socioeconomic, political, financial and civil society contexts to establish a niche for CEPF investment in the Tropical Andes Hotspot that seeks long-lasting benefits to biodiversity and the people of the Andes. CEPF's focus on supporting civil society to bring about biodiversity conservation is a major consideration in determining arenas for investment.

Key Findings

The ecosystem profile underscores several key findings to guide the development of the CEPF investment niche.

Underlying the niche is the recognition that the biodiversity of the Tropical Andes Hotspot stands as unequaled in the world when measured by species richness and endemism. It contains about one-sixth of all plant life in less than one percent of the world's land area. The hotspot has the largest variety of amphibians, birds, and mammals, and takes second place globally after the Mesoamerica Hotspot for reptile diversity.

The hotspot's ecosystem services are equally noteworthy. Its rivers provide water for municipal supply, agriculture, and energy for all the cities of western South America, including for the 57 million people who live within its borders. They also serve as the headwaters for the Amazon and Orinoco Rivers, the world's largest and third largest rivers by discharge. Its forests store over 5.4 billion tonnes of carbon, about the amount of carbon emitted by one billion cars each year.

Juxtaposed with its biological diversity is the hotspot's cultural diversity. Predominantly populated by Spanish-speaking *mestizos,* the Andes have over 40 indigenous groups and Afro-descendants. While lands owned or reserved for indigenous peoples and communities represents over 52% of the hotspot's land area, the people that live in these territories are among the poorest in the hotspot. A high priority for conservation in the hotspot must be placed on building the capacity of indigenous and Afro-descendent communities to sustainably manage their vast territories.

Over the last decades, the seven countries of the Andes have made important strides in their economic development. Per capita GDP growth has averaged 4.2 percent per year, lifting millions of people out of poverty, although growth in 2014 has slowed to 3.5 percent and is expected to fall further with the drop in commodity prices in 2015. Fueling the economy has been spectacular growth in the mining and oil sector and infrastructure construction. The ecosystem profile identifies 65 large-scale infrastructure projects in the 2013 South American Regional Integration Initiative (IIRSA) portfolio that are budgeted at nearly $12 billion and have potential direct and/or indirect impacts on the KBAs. Investment and lending from China in all Andean countries from 2005 to 2013 totaled $99.5 billion for mining, infrastructure and hydrocarbon development.

An historic demographic shift from rural to urban populations and the growth of the middle class are altering the dynamic of some of the historic drivers of deforestation, creating new demand for consumer goods, energy and water. In addition, governmental capacity for environmental protection and protected areas management has increased notably across most countries. Decentralization has resulted in the devolution of responsibility for natural resources management to regional and municipal authorities. Innovative policies for climate change, economic incentive schemes, environmental mitigation, private protected areas and alike have come on line, making the hotspot a learning laboratory for pioneering approaches to bridge conservation with economic development.

While the countries of the Andes have made impressive gains, the profile also finds that major threats persist and new ones loom large on the horizon for the hotspot's biodiversity and ecosystem services.

The ecosystem profile identifies 814 globally threatened species, the highest number of any hotspot in the world. Another 1,314 species occur in ranges so small as to be highly susceptible to rapid population declines. Funding to safeguard the most endangered species from extinction is very small at $10.5 million from 2009 to 2013, accounting for about 3% of all total monies dedicated to biodiversity conservation, leaving highly endangered species still very vulnerable to extinction.

The profile identifies 442 KBAs that cover 33.2 million hectares, equivalent to about 21 percent of the hotspot area. Only the Indo-Burma Hotspot with 509 KBAs has more KBAs. The ecosystem profile finds that only 44 percent of the area found inside a KBA is fully protected, covering 15.1 million ha. Another 29 percent of land area within a KBA is completely unprotected, covering 9.8 million hectares. Most concerning, 63 of the 116 KBAs (54 percent) classified as Alliance for Zero Extinction (AZE) sites, those areas that habour the most threatened and irreplaceable species with the greatest risk of extinction, are completely unprotected.

Despite the hotspot's rapid economic growth, overall poverty rates in rural areas reaches as high as 60 percent. Persistently high indices of income inequality and poverty reflect how many rural communities operate outside of the formal economy and lack access to economic opportunities. These communities can be found in and around the KBAs, and must be a focus of the CEPF niche given their important role in site-based conservation.

While many national institutions with responsibility for environmental management have been strengthened, cause for concern remains. The billions of dollars invested in infrastructure and extractive activities are widely viewed as lacking sufficient social and environmental safeguards to ensure their sustainability, and as a result, several projects are marred by protests by local communities. Furthermore, pressure to sustain economic development has led to weakening of environmental institutions and policies, with Venezuela recently dismantling its environmental ministry and with Peru removing several key environmental regulations.

In general, the profile finds that biodiversity considerations are poorly valued in development planning and investment decision makings. Decentralization presents a promising opportunity for CEPF to help empower local stakeholders for environmental management, since experience shows that subnational governments frequently lack the technical and financial wherewithal to carry out their new environmental management responsibilities. Furthermore, given the region's reliance on infrastructure and extractive industries, models for integrating local participation and environmental and social safeguards need to be development to demonstrate the benefits to the sustainability of these large investments. Information on the economic, environmental, and social benefits of stakeholder participation and safeguards integration can help build constructive approaches to ensure the sustainability.

The ecosystem profile also finds that funding for conservation remains a persistent obstacle. For example, protected areas budget -- which range from a high of $2.95 per hectare per year in Colombia to a low of $0.51 per hectare per year in Bolivia -- are unable to cover basic operating expenses. Similarly, civil society groups working on environmental issues are woefully underfunded. The profile finds that international funding to civil society organizations equaled $12.5 million per year to cover an area three times the size of Spain, across seven countries. Funding difficulties have meant that some groups struggle to remain open, while others have closed their doors completely. CEPF can help to introduce new approaches to promote sustainable financing for the KBAs and for local civil society organizations.

The profile also finds a major imbalance exists between large budgets and strong pressure to move forward with infrastructure and extractive industries, with the ability of local civil society groups to remain at the frontlines of conservation and serve as effective caretakers of biodiversity of the Tropical Andes hotspot. The profile finds that local and national civil society groups have significant deficits with respect to organizational capacity, and securing stable funding remains a critical concern. Those civil society groups representing local indigenous and Afro-descendants are particularly weak and their ability to manage indigenous territories for sustainability needs to be strengthened significantly. To address these weaknesses, CEPF should build local institutional capacity of key partner organizations.

Looking to the future, scientists say the impacts of climate change are already being felt throughout the hotspot and are expected to intensify in coming decades, impacting water availability, the frequency and intensity of extreme weather events, agricultural productivity, disease outbreaks and land degradation. Should these development and environmental trends continue, the hotspot inevitably will undergo major transformation, putting the hotspot's world-class biological diversity and vital ecosystem services at continued risk.

CEPF Niche

The ecosystem profile finds that the Tropical Andes Hotspot is at an important juncture, as unprecedented economic growth based on extractive industries and infrastructure expansion brings the promise of development to millions of people, but also come with potentially large environmental and social costs. Given this imperative, CEPF will work to ensure that the Andes' outstanding biodiversity and ecosystem services are conserved in perpetuity in its highest priority areas, while promoting development approaches that are compatible with environmental and social sustainability.

The CEPF investment niche is to enable local indigenous, Afro-descendant, mestizo, and environmental civil society groups to serve as effective advocates for and facilitators of multi-stakeholder approaches that promote biodiversity conservation and sustainable development in the Tropical Andes Hotspot. Civil society organizations stand in an excellent position to bridge biodiversity conservation and sustainable development with goals of economic growth. Collectively, they understand the needs and aspirations of local people, have technical expertise and field experience in linking biodiversity conservation with local development, and have a long track record of leadership in advocating for environmental and social sustainability.

The niche calls for supporting civil society groups at two mutually-dependent levels of action in the highest priority KBAs and corridors of the hotspot:

- At the **site level**, CEPF will seek to put place the enabling conditions required to achieve long-term conservation and sustainable development in the highest priority KBAs. Support will target traditional management planning and implementation in protected areas. In unprotected sites, CEPF will promote appropriate land management designations, secure land tenure, and planning frameworks to foster a development path that is based on sustainability. At the same time, CEPF will support the development of incentive schemes that offer tangible benefits to local communities from biodiversity conservation and sustainable resource management.

- At the **corridor level**, CEPF will work to ensure sub-national governance frameworks -- specifically with provincial, departmental, state, and municipal governments where responsibility for resource management has been decentralized -- to support sustainable development by mainstreaming biodiversity conservation into policies, projects and plans undertaken by the private sector and governments.

  - For the public sector, CEPF will support efforts with sub-national governments to mainstream biodiversity conservation and sustainable development into landscape-scale public policy planning and implementation frameworks. Special emphasis will be placed on ensuring the social and environmental sustainability of large development projects and mainstreaming biodiversity conservation into broader development programs and financing schemes.

  - For the private sector, CEPF will support opportunities to strengthen and scale up the linkage between conservation and income generation, such as for coffee and ecotourism. It will seek to scale up private sector financing for conservation. CEPF will also promote constructive approaches to engage extractive industries and infrastructure developers to ensure that social and environmental safeguards are adopted for development schemes that put the KBAs at risk.

The CEPF niche calls for integrating two crossing-cutting themes into all relevant grant-making objectives and programming: mainstreaming climate change resilience and strengthening capacities for indigenous people and Afro-descendants. CEPF will seek to ensure the sustainability of the results achieved through capacity building of those civil society partners that are strategically positioned to achieve CEPF conservation outcomes. Furthermore, building local capacities and mechanisms for sustainable financing will be paramount importance, as will leveraging funding from existing incentive programs, such as Ecuador’s Socio Bosque program.

The niche also recognizes that CEPF's role will need to be highly catalytic, to foster multi-stakeholder alliances and to leverage new and existing resources to launch and/or strengthen a development path that integrates the conservation of biodiversity and ecosystem services with economic growth. CEPF will build the capacity of local civil society groups and multi-stakeholder alliances to achieve consensus on common development and conservation objectives and to support key approaches to achieve these objectives. It will be essential to foster consensus and conflict resolution techniques from a broad cast of stakeholders groups – from environmental and development agencies at all governmental levels, the private sector, representatives of federations of indigenous peoples and campesinos, and the environmental community.

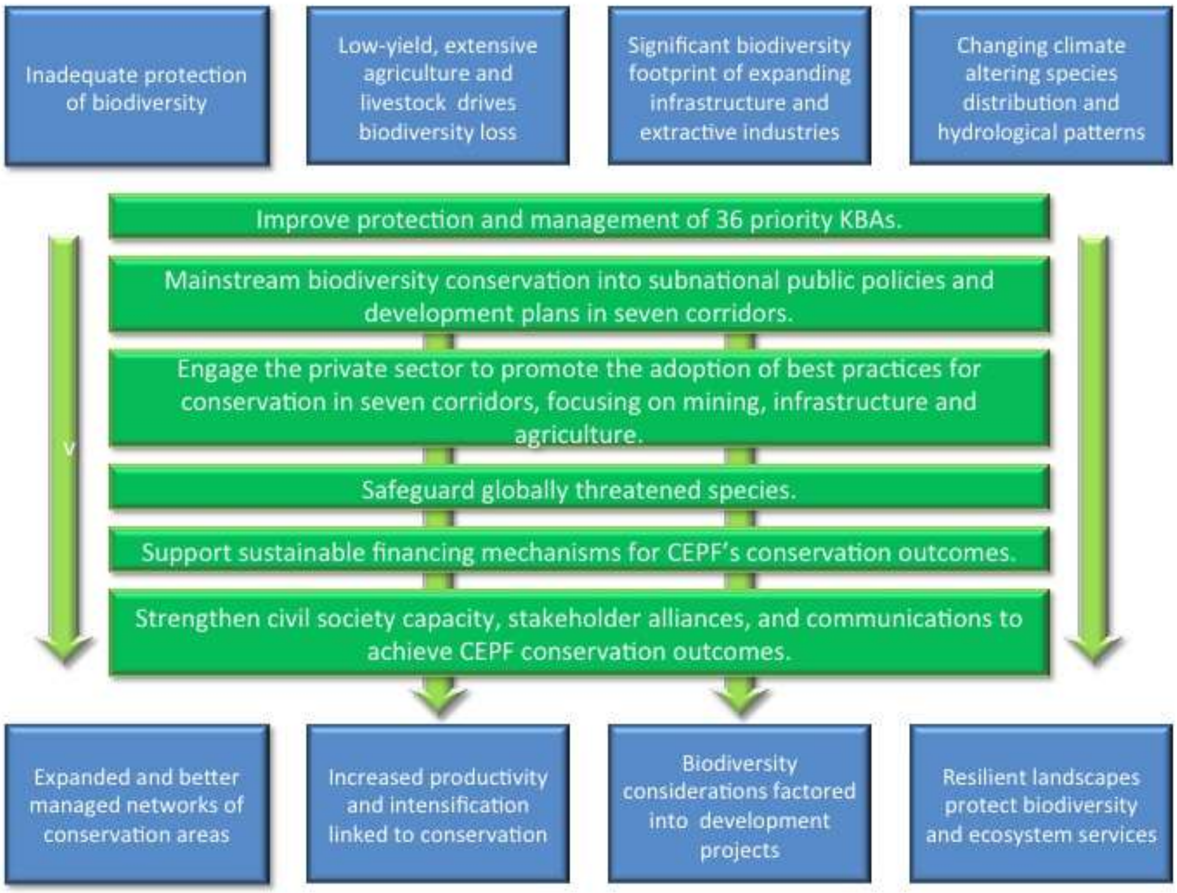
CEPF seeks to work in close partnership with public and private conservation donors to ensure complementarity of funding priorities and to identify opportunities for synergies. Special effort will be put on collaborating with those CEPF donors that have active programs in the hotspot, namely with Conservation International, the European Union, the Global Environment Facility, the Government of Japan, the MacArthur Foundation, and The World Bank.

CEPF also will seek to work closely with the conservation trust funds, building on fruitful collaborations during previous CEPF investments with Fondo Accion, FAN, FONDAM, and FUNDESNAP. Collaboration also will be pursued with private donors funding conservation efforts.

Theory of Change

The CEPF niche reflects a theory of change in which strengthened local civil society organizations are able to help confront threats to biodiversity by improving management and influencing development policy and the private sector (Figure 11.1).

Figure 11.1. Theory of Change for CEPF's Niche in the Tropical Andes Hotspot



12. CEPF INVESTMENT STRATEGY

Encapsulating the investment niche in the Tropical Andes Hotspot, CEPF aims to leave a legacy over the long run, whereby civil society groups can serve as effective stewards and champions to safeguard hotspot's globally outstanding biological diversity, while ensuring the health of its vital ecosystem services, resilience in the face of global climate change, and welfare of its people. The investment strategy in this chapter lays out a road map to achieve this ambitious mission that is based on a methodological rigorous process to identify conservation outcomes that was complemented by a participatory process that engaged more than 200 civil society, donor and governmental stakeholders throughout the hotspot. The strategy reflects the needs, priorities, and aspirations of Andean civil society groups.

12.1 KBA and Corridor Prioritization

To ensure that the investment strategy delivers significant and sustained impacts for biodiversity conservation, CEPF seeks to avoid spreading funding too thinly. For this reason, the profile identifies a set of priority geographies from among the 442 KBAs and 29 corridors presented in Chapter 4. A detailed description of the prioritization process is described in Appendix 7, and data for the individual KBAs analyzed presented in Appendix 8. The process relied on assessing the 92 highest ranking KBAs in terms of relative biodiversity value against the following eight factors:

i. *Biological importance* – Relative biodiversity value of individual KBA as determined by the presence of threatened species, their status on the IUCN Global Red List, and site irreplaceability.

ii. *Degree of threat* – Vulnerability scores based on the presences of such threats as agriculture, roads, cities, oil pipelines, and mines.

iii. *Funding need* - Level of investment by national and international donors for conservation at the corridor level.

iv. *Management need* – Existence of management plans, staffing and infrastructure, and mechanisms for community engagement and sustainable funding.

v. *Civil society capacity* - Derived from the institutional capacity surveys and consultations, emphasizing the capacity need of local civil society groups.

vi. *Operational feasibility* – Viability of civil society to work effectively in a site based on security risk, drug trafficking, or legal prohibitions.

vii. *Opportunity for landscape-scale conservation* – Ability to achieve landscape-scale conservation through linkage to large KBAs.

viii. *Alignment with national priorities* - Support for those KBAs that are national biodiversity priorities.

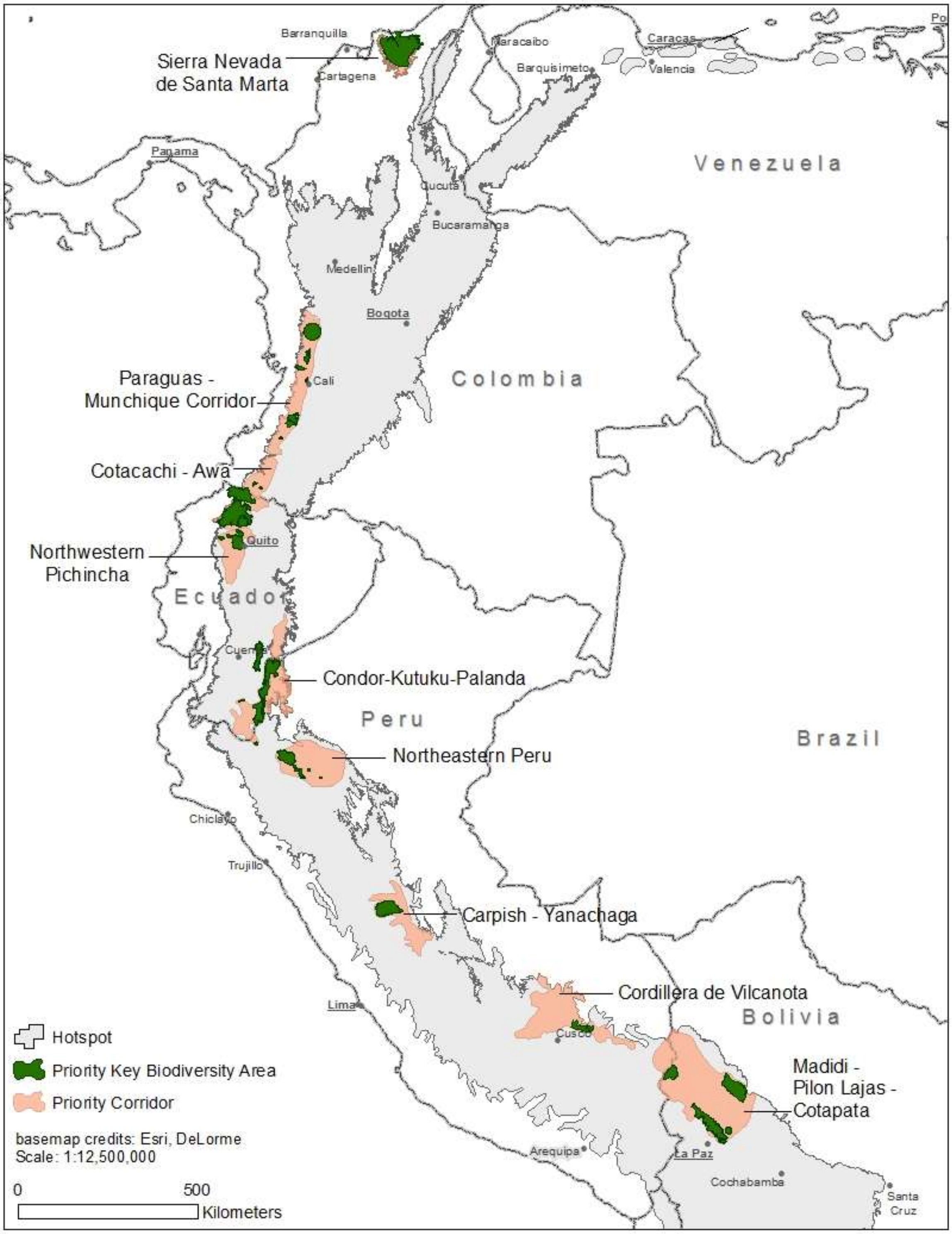
Of the 442 KBAs identified to date in the hotspot, the investment strategy will target 36 sites that are considered the highest priorities (Table 12.1 and 12.2, Figure 12.1). These 36 KBAs cover 3,399,016 ha. in four countries, which is about 10 percent of the 33,249,405 ha of habitat found within the borders of the KBAs. Collectively, they represent those sites with the highest biological values, are under the most threat, and are in need of urgent management improvement. Only 12 percent of their land area is only partially protected or completely protected. The priority KBAs range in size from 348 ha (Alto de Oso in Colombia) to 652,714 ha (Sierra Nevada de Santa Marta National Natural Park and surrounding areas in Colombia), with an average size of 94,417 ha. Several priority KBAs overlap with indigenous and Afro-descendant territories. Furthermore, many priority KBAs provide vital ecosystem services, supplying water to major cities and agricultural zones and sustaining vast tracks of carbon-rich forests.

To maintain the critical ecosystem services upon which the priority KBAs rely on, CEPF will target management improvements in seven priority corridors or corridor clusters, which cover 16,133,041 ha, or about 10 percent of the entire hotspot. The largest corridor is Madidi - Pilón Lajas – Cotapata that spans across Bolivia and Peru at 4,620,196 ha, and the smallest is Sierra Nevada de Santa Marta in Colombia at 652,714 ha. Several priority KBAs overlap with indigenous and Afro-descendant territories. Figure 12.2 presents detailed maps of the priority KBAs and corridors in Colombia, Ecuador, Peru, and Bolivia.

Most priority KBAs are located in Colombia (11 KBAs) and Ecuador (12 KBAs), with fewer in Peru (7 KBAs) and Bolivia (6 KBAs). Several factors account for the higher prioritization scores in the hotspot's northern countries, including highly threatened and irreplaceable biodiversity; high potential impact of funding due to limited investments in priority KBAs; high vulnerability due to high population density within the hotspot, and an expanding economy that places stronger pressure on natural ecosystems; emerging governance mechanisms that are friendly to conservation investment; and improved security as armed insurgencies become more restricted in their extent and peace negotiations advance in Colombia. Peru's priority corridors are characterized by high relative biodiversity value, good operational feasibility, need for improved management, and opportunities for landscape-scale conservation. Bolivia's Madidi - Pilón Lajas - Cotapata corridor also has good operational feasibility, high need for improved management, opportunities for landscape-scale conservation, and high threat.

KBAs in Argentina, Chile, or Venezuela do not appear on the priority list. Sites in Argentina and Chile register lower in their relative biodiversity values compared to their northern counterparts. In Venezuela, low operational feasibility makes CEPF engagement difficult, reflecting low priority scores for its KBAs. However, support to CSOs in these three countries through hotspot-wide alliance building and information sharing investments remains very important due to the lack of hotspot-wide networking opportunities currently available for these typically high-capacity groups.

Figure 12.1. Priority KBAs and Corridors for CEPF Investment in the Tropical Andes Hotspot



Note: The Paraguas-Munchique, Cotacachi-Awa and Northwestern Pichincha corridors will be managed as a cluster of corridors.

Table 12.1. CEPF Priority KBAs in the Tropical Andes Hotspot

	Name	CEPF Code	Country	Biological priority	Degree of threat	Need for more cons. funding	Management need	Opport. to strengthen CSO capacity	Operational Feasibility	Opport for landscape conservation	Coincidence with national priorities	Overall score
1	Bosque de Polylepis de Madidi	BOL5	Bolivia	2[1]	2	2	3	3	3	3	3	23[2]
2	Bosque de Polylepis de Sanja Pampa	BOL7	Bolivia	1	4	3	3	3	3	1	1	20
3	Bosque de Polylepis de Taquesi	BOL8	Bolivia	1	1	3	3	3	3	4	1	20
4	Coroico	BOL12	Bolivia	1	1	3	4	3	3	2	1	19
5	Cotapata	BOL13	Bolivia	3	2	3	3	3	3	4	2	26
6	Yungas Inferiores de Pilón Lajas	BOL37	Bolivia	1	4	3	3	4	3	4	1	24
7	Alto de Oso	COL4	Colombia	2	4	2	4	2	3	1	1	21
8	Bosque de San Antonio/Km 18	COL7	Colombia	4	4	2	2	2	3	1	1	23
9	Munchique Sur	COL54	Colombia	4	2	2	2	2	3	2	1	22
10	Parque Nacional Natural Munchique	COL67	Colombia	3	2	2	2	2	3	3	1	21
11	Parque Natural Regional Páramo del Duende	COL75	Colombia	3	1	2	2	2	3	3	4	23
12	Región del Alto Calima	COL80	Colombia	3	3	2	3	2	3	2	1	22
13	Reserva Natural La Planada	COL88	Colombia	4	3	1	1	2	2	1	1	19
14	Reserva Natural Río Ñambí	COL91	Colombia	3	4	1	1	2	2	2	1	19
15	Serranía de los Paraguas	COL106	Colombia	3	4	2	2	2	3	4	1	24
16	Serranía del Pinche	COL109	Colombia	3	4	2	2	2	3	1	1	21
17	Sierra Nevada de Santa Marta National Natural Park and surrounding areas	COL110	Colombia	1	2	4	3	2	3	4	2	22
18	Abra de Zamora	ECU2	Ecuador	3	4	2	2	2	3	1	3	23
19	Alrededores de Amaluza	ECU6	Ecuador	3	2	4	4	2	3	3	2	26
20	Bosque Protector Alto Nangaritza	ECU9	Ecuador	1	3	2	2	2	3	3	3	20
21	Cordillera del Cóndor	ECU27	Ecuador	1	3	2	4	2	3	4	3	23
22	Corredor Awacachi	ECU28	Ecuador	3	2	1	4	2	2	2	2	21
23	Intag-Toisán	ECU34	Ecuador	2	4	1	2	2	3	3	2	21
24	Los Bancos-Milpe	ECU41	Ecuador	4	3	2	3	1	3	2	2	24
25	Maquipucuna-Río Guayllabamba	ECU43	Ecuador	4	4	2	2	1	3	2	3	25
26	Mindo and western foothills of Volcan Pichincha	ECU44	Ecuador	4	4	2	2	1	3	3	3	26
27	Río Caoní	ECU54	Ecuador	3	4	2	4	1	3	2	1	23
28	Reserva Ecológica Cotacachi-Cayapas	ECU61	Ecuador	3	2	1	2	2	3	4	2	22
29	Territorio Étnico Awá y alrededores	ECU70	Ecuador	2	3	1	4	3	3	4	3	25
30	7 km East of Chachapoyas	PER4	Peru	3	1	1	3	1	3	1	4	20
31	Abra Pardo de Miguel	PER6	Peru	4	2	1	3	1	3	1	4	23
32	Carpish	PER18	Peru	2	3	1	4	2	3	4	4	25
33	Cordillera de Colán	PER29	Peru	4	1	1	2	1	3	4	1	21
34	Kosnipata Carabaya	PER44	Peru	3	2	2	3	1	4	3	4	25
35	Rio Utcubamba	PER84	Peru	4	3	1	3	1	3	3	1	23
36	San Jose de Lourdes	PER86	Peru	2	3	2	4	2	3	1	1	20

[1] 1=low, 2=fair, 3=high and 4=very high.

[2] Sum of all factor scores, with biodiversity value counted double.

Table 12.2. Summary of Priority Conservation Corridors and Clusters for CEPF Investment in the Tropical Andes Hotspot

Corridor	Priority KBAs	Area (ha)
Sierra Nevada de Santa Marta Corridor (Colombia)	Sierra Nevada de Santa Marta National Natural Park and surrounding areas (COL110)	652,714
	Corridor priority KBA area	**652,714**
Paraguas - Munchique, Cotacachi - Awa, Corridor, Northwestern Pichincha Corridor Cluster (Colombia and Ecuador)	Alto de Oso (COL4)	348
	Bosque de San Antonio/Km 18 (COL7)	5,994
	Corredor Awacachi (ECU28)	28,436
	Intag-Toisán (ECU34)	65,005
	Los Bancos-Milpe (ECU41)	8,272
	Maquipucuna-Río Guayllabamba (ECU43)	21,070
	Mindo and western foothills of Volcan Pichincha (ECU44)	103,494
	Munchique Sur (COL54)	28,358
	Parque Nacional Natural Munchique (COL67)	52,107
	Parque Natural Regional Páramo del Duende (COL75)	32,136
	Región del Alto Calima (COL80)	21,918
	Reserva Ecológica Cotacachi-Cayapas (ECU61)	369,936
	Reserva Natural La Planada (COL88)	3,399
	Reserva Natural Río Ñambí (COL91)	8,595
	Río Caoní (ECU54)	9,101
	Serranía de los Paraguas (COL106)	171,967
	Serranía del Pinche (COL109)	4,870
	Territorio Étnico Awá y alrededores (ECU70)	204,930
	Corridor priority KBA area	**1,139,936**
Condor-Kutuku-Palanda Corridor (Ecuador and Peru)	Abra de Zamora (ECU2)	6,671
	Alrededores de Amaluza (ECU6)	109,052
	Bosque Protector Alto Nangaritza (ECU9)	112,692
	Cordillera del Cóndor (ECU27)	257,018
	San Jose de Lourdes (PER86)	5,005
	Corridor priority KBA area	**490,438**
Northeastern Peru Corridor (Peru)	7 km East of Chachapoyas (PER4)	2,896
	Abra Pardo de Miguel (PER6)	4,195
	Cordillera de Colán (PER29)	134,874
	Rio Utcubamba (PER84)	35,534
	Corridor priority KBA area	**177,499**
Carpish – Yanachaga Corridor (Peru)	Carpish (PER17/18)	211,340
	Corridor priority KBA area	**211,340**
Cordillera de Vilcanota Corridor (Peru)	Kosnipata-Carabaya (PER44)	86,512
	Corridor priority KBA area	**86,512**
Madidi - Pilón Lajas - Cotapata Corridor (Bolivia and Peru)	Bosque de Polylepis de Madidi (BOL5)	94,614
	Bosque de Polylepis de Sanja Pampa (BOL7)	1,878
	Bosque de Polylepis de Taquesi (BOL8)	3,456
	Coroico (BOL12)	25,569
	Cotapata (BOL13)	265,202
	Yungas Inferiores de Pilón Lajas (BOL37)	249,858
	Corridor priority KBA area	**640,577**

Corridor	Priority KBAs	Area (ha)
Total	**CEPF Priority KBA area**	**3,399,016**

All seven priority corridors share a number of attributes that make them excellent candidates for CEPF support.

Sierra Nevada de Santa Marta Corridor (Colombia). The corridor includes eight threatened amphibians, one threatened reptile, five threatened birds and four threatened mammals in one priority KBA, as well as isolated páramo habitat with endemic plants. Ecosystem services include water provision to 1.2 million people and to important agricultural areas, food provision, and substantial carbon storage in lower elevation forests. The corridor is less threatened compared to other priority corridors due to its history of poor security. However, stakeholders expressed concerns that improved safety with peace talks may well lead to pressures from development and habitat loss. The corridor provides significant opportunity to work with numerous indigenous communities. According to a 2013 study published in *Science* to identify the most 'irreplaceable" individual protected areas in the world, the Sierra Nevada de Santa Marta Natural National Park ranks number one globally out of 173,000 protected areas assessed. The analysis found that the isolated mountain range is home to over 40 endemic species, many of which are threatened with extinction.

Paraguas-Munchique, Cotacachi-Awa, Corridor, Northwestern Pichincha Corridor Cluster (Colombia and Ecuador). This corridor cluster includes 32 threatened amphibians, one threatened reptile, 26 threatened birds and four threatened mammals in 18 priority KBAs, as well as isolated páramo habitat with endemic plants. Threatened by agricultural expansion and development, its ecosystem services provide water for the cities and agricultural regions of Cali and Quito and surrounding areas, support food security, store carbon, and provide ecotourism services. Opportunities exist to work with Awa and Embera indigenous and Afro-descendent communities. CEPF has previous experience promoting conservation in this corridor under its portfolio in the Tumbes-Chocó-Magdalena hotspot.

Condor-Kutuku-Palanda Corridor (Ecuador). This corridor includes 16 threatened amphibians, one threatened reptile, eight threatened birds and two threatened mammals (including mountain tapir) in four priority KBAs, as well as isolated páramo habitat with endemic plants. Critical ecosystem services include large amounts of carbon storage, which are threatened by mining and road expansion.

Northeastern Peru Corridor (Peru). This corridor includes two narrow endemic plants, ten threatened amphibians, six threatened birds and two threatened mammals in four priority KBAs. Threatened by planned roads and dams, and unclear land tenure, its ecosystem services include water provisioning, carbon storage and ecotourism opportunities. A highly successful REDD+ project in Alto Mayo provides an excellent model for scaling up to under-funded KBAs in the corridor.

Carpish-Yanachaga Corridor (Peru). This corridor includes seven threatened amphibians, five threatened birds, one vulnerable mammal, one vulnerable reptile, and three threatened plants within two KBAs. The red list assessment information for all these vertebrates cites continuing decline in the extent and quality of their habitat due to conversion to agriculture and illicit crops. The corridor includes Yanachaga Chemillen National Park and its buffer areas, with ongoing long-term research and biodiversity monitoring projects, including by the Tropical Ecology Assessment and Monitoring (TEAM) Network. Yanesha indigenous communities live on the eastern slope of this corridor and farmers occupy valleys on the western side of this corridor, especially in the area known as Oxapampa. The local government is currently in the process of designating Carpish as a sub-national protected area.

Cordillera de Vilcanota Corridor (Peru). This corridor includes seven narrow endemic plants, six of them threatened, five threatened amphibians, and two threatened birds in three high biodiversity KBAs. The corridor has two pipelines and the Inter-Oceanic Highway. No priority KBAs are currently under legal protection. Critical ecosystem services include carbon storage in extensive forest tracts. The corridor provides opportunity to work with the Huayruro and Q'Ero indigenous communities.

Madidi-Pilón Lajas-Cotapata Corridor (Peru and Bolivia). This corridor includes nine narrow endemic plants, four threatened amphibians and three threatened birds in six priority KBAs. Threatened by mining, oil concessions, and road expansion, its ecosystem services include carbon storage. The corridor provides opportunities to work with the Lecos, Tacanas, Quechua, Esse Eja, Chimane and Mosetene indigenous communities. CEPF's previous investment regions focused on this corridor.

Priority Species and Taxa

To maximize the contribution of CEPF investment to the conservation of globally significant biodiversity, the strategy calls for targeted interventions to safeguard globally Endangered and Critically Endangered species and their taxonomic groups. CEPF seeks to enable investments for those globally threatened species whose conservation needs cannot adequately be addressed by general habitat protection alone. The profile finds that 814 species are globally threatened (Table 4.2), of which 171 Critically Endangered and Endangered species can be found in the seven CEPF priority corridors (see Table 12.3). Amphibians are by far the most threatened taxonomic group assessed to date due to the chytrid fungus and habitat loss, resulting in catastrophic declines and disappearances.

Table 12.3. Summary of Species Priorities for the Tropical Andes Hotspot

Taxonomic group	Number of species[1]
Amphibian	109
Bird	36
Mammal	10
Reptile	3
Plants	13
Total	**171**

[1] Includes only species with at least 10% of their range (5% for birds) in a priority corridor or corridor cluster.

Figures 12.2. Maps of Key Biodiversity Areas and Corridors for CEPF Investment in the Tropical Andes Hotspot

Figure 12.2.i. Colombia and Ecuador

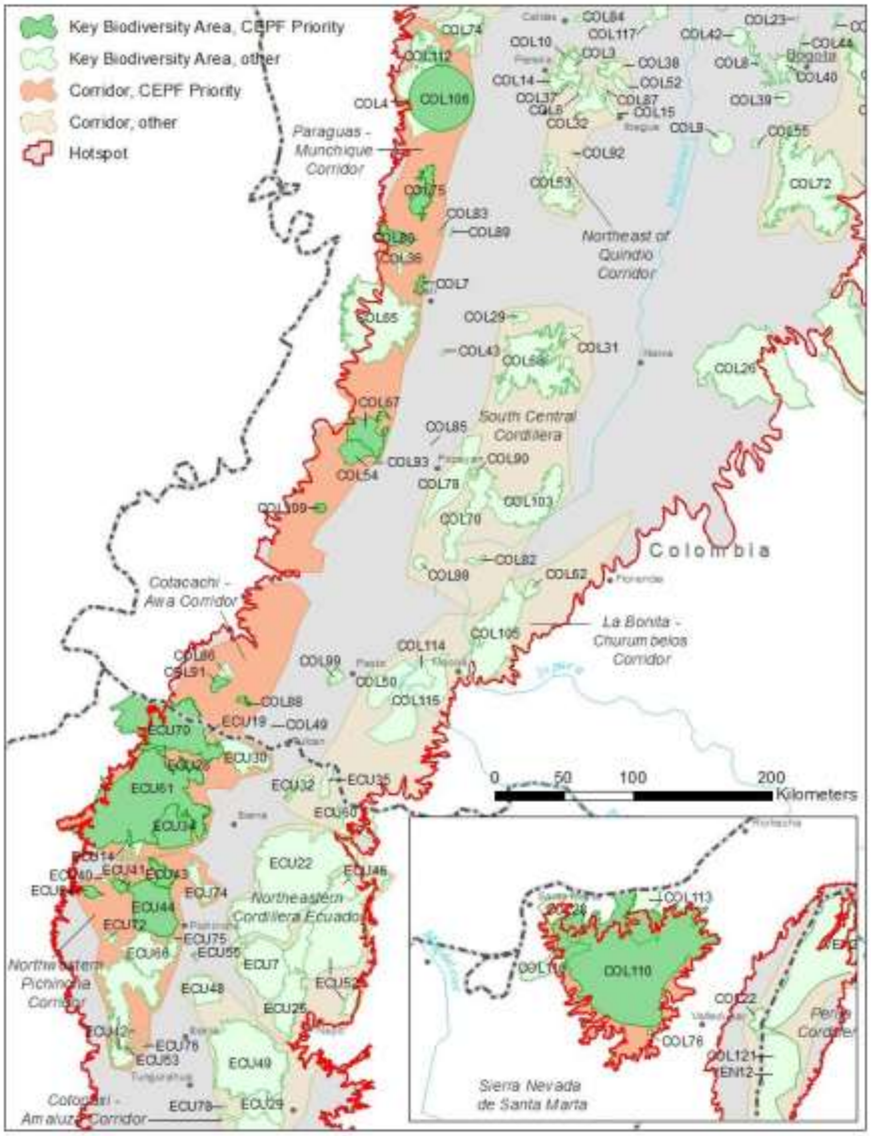


Figure 12.2.ii. Ecuador

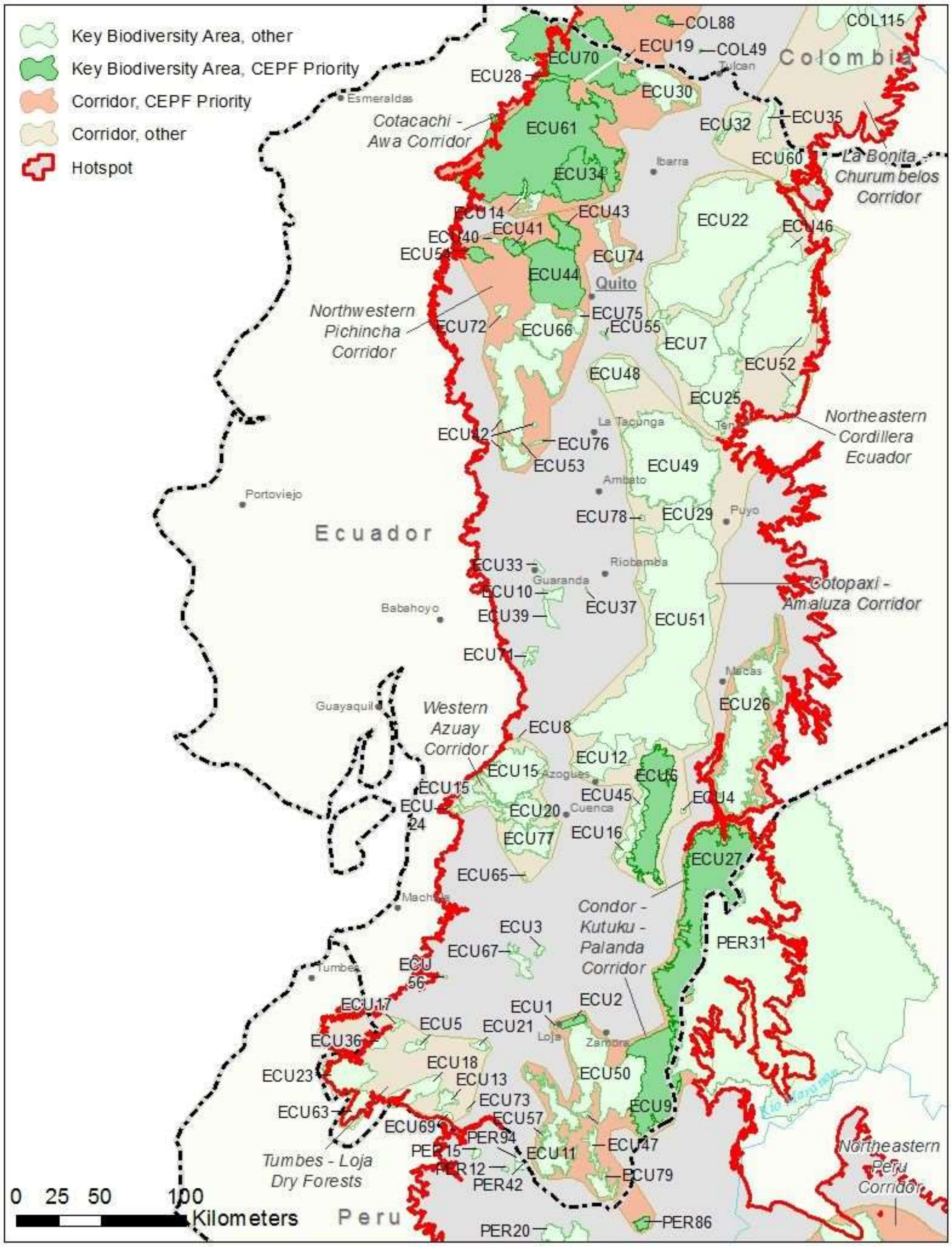
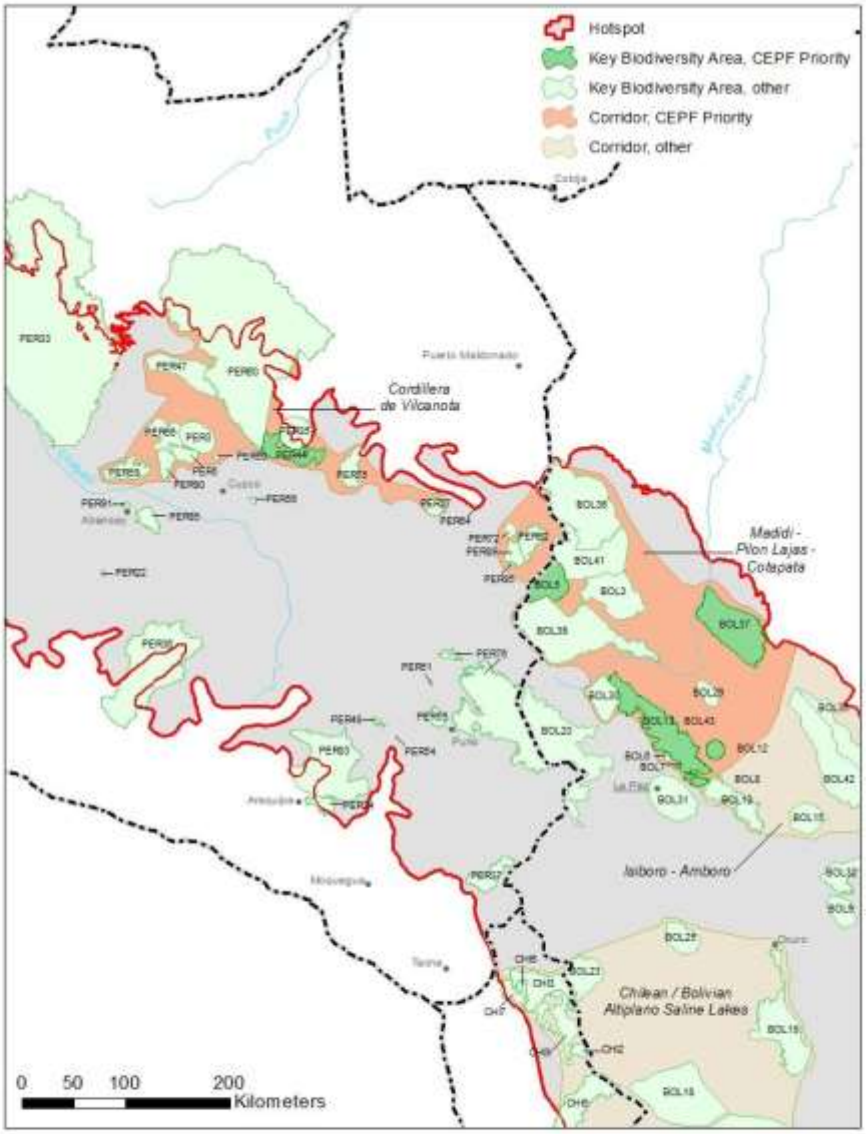


Figure 12.2.iii. Northern Peru

Figure 12.2.iv. Southern Peru and Bolivia



12.2 Strategic Directions and Investment Priorities

To achieve the CEPF niche and conservation outcomes, CEPF will provide grants to civil society organizations over a five-year period to achieve seven strategic directions and their corresponding investment priorities. The strategy calls for integrating as a cross-cutting objectives planning for climate change adaptation and resilience and strengthening capacity for indigenous and Afro-descendent civil society groups and their territories. Six strategic directions directly target the achievement of the CEPF niche and conservation outcomes. The seventh strategic direction supports a regional implementation team (RIT), which provides strategic leadership, management support, and stakeholder outreach and assistance in fulfillment of the CEPF investment strategy. These strategic directions are based on stakeholder consultations from eight workshops, complemented by analysis and information presented in the ecosystem profile. Strategic directions are summarized in Table 12.4 and described in greater detail below.

Table 12.4. CEPF Strategic Directions and Investment Priorities for the Tropical Andes Hotspot

Strategic Directions	Investment Priorities
1. Improve protection and management of 36 priority KBAs to create and maintain local support for conservation and to mitigate key threats.	1.1 Support preparation and implementation of participatory management plans that promote stakeholder collaboration in managing protected KBAs.
	1.2 Facilitate the establishment and/or expansion of indigenous, private, and subnational reserves and multi-stakeholder governance frameworks for conserving unprotected and partially protected KBAs.
	1.3 Strengthen land tenure, management, and governance of indigenous and Afro-descendant territories.
	1.4 Catalyze conservation incentives schemes for biodiversity conservation for local communities.
2. Mainstream biodiversity conservation into public policies and development plans in seven corridors to support sustainable development, with a focus on sub-national governments.	2.1 Support land-use planning and multi-stakeholder governance frameworks that create shared visions for integrating biodiversity conservation and ecosystem services into the corridor-level development.
	2.2 Integrate biodiversity objectives into development policies, programs, and projects that impact resource use, including climate change, agricultural development, and water resources management.
	2.3 Promote traditional and innovative financial mechanisms for conservation, including payments for ecosystem services, leveraging of rural and micro-credit, mainstreaming biodiversity into climate change programs, and compensation mechanisms to mobilize new conservation finance.
3. Promote local stakeholder engagement and the integration of social and environmental safeguards into infrastructure, mining and agriculture projects to mitigate potential threats to the KBAs in the seven priority corridors.	3.1 Build local capacity and facilitate public consultation and alliance building in the assessment, avoidance, mitigation, and monitoring of environmental impacts of large development projects that pose a direct or indirect risk to the KBAs.
	3.2 Encourage constructive approaches to promote environmental and social sustainability of infrastructure, mining, and agriculture projects through partnerships between civil society groups, the private sector, and international investors.
	3.3 Integrate biodiversity objectives into development policies, programs, and projects related to mining, infrastructure, and agriculture.
4. Promote and scale up opportunities to foster private sector approaches for biodiversity conservation to benefit priority KBAs in the seven corridors.	4.1 Promote the adoption and scaling up of conservation best practices in those enterprises compatible with conservation to promote connectivity and ecosystem services in the corridors.
	4.2 Encourage private sector partners and their associations to integrate conservation their business practices and implement corporate social responsibility policies and voluntary commitments
	4.3 Leverage of private-sector financing schemes, such as carbon projects and green bonds that benefit the conservation outcomes.
5. Safeguard globally threatened species.	5.1 Prepare, help implement, and mainstream conservation action plans for the priority Critically Endangered and Endangered species and their taxonomic groups.
	5.2 Update KBA analysis for mainstreaming to incorporate new AZE sites and Red Listing of reptiles, freshwater species and plants, based on addressing several high-priority information gaps.
6 Strengthen civil society capacity, stakeholder	6.1 Strengthen the administrative, financial and project management, and fundraising capacity of civil society organizations and indigenous and Afro-descendent authorities to

alliances and communications to achieve CEPF conservation outcomes, focusing on indigenous, Afro-descendent and mestizo groups	promote biodiversity conservation in their territories.
	6.2 Enhance stakeholder cooperation, alliance building and sharing of lessons learned to achieve CEPF's conservation outcomes, including efforts to foster hotspot-wide information sharing.
	6.3 Strengthen capacity in communications of CEPF partners to build public awareness of the importance of the conservation outcomes.
	6.4 Pilot and scale up promising approaches for the long-term financing of local and national civil society organizations and their conservation missions.
7 Provide strategic leadership and effective coordination of CEPF investment through a regional implementation team.	7.1 Operationalize and coordinate CEPF's grant-making processes and procedures to ensure effective implementation of the investment strategy throughout the hotspot.
	7.2 Build a broad constituency of civil society groups working across institutional and political boundaries toward achieving the shared conservation goals described in the ecosystem profile.
	7.3 Engage governments and the private sector to mainstream biodiversity into policies and business practices.
	7.4 Monitor the status of biogeographic and sectoral priorities in relation to the long-term sustainability of conservation in the hotspot.
	7.5 Implement a system for communicating and disseminating information on conservation of biodiversity in the hotspot.

Strategic Direction 1. Improve protection and management of 36 priority KBAs to create and maintain local support for conservation and to mitigate key threats.

Safeguarding the 36 highest priority KBAs in the Tropical Andes requires a multi-pronged approach. Site-based protection is and will remain a cornerstone for the conservation of threatened species and ecosystems in the Tropical Andes. However, only 12 percent of the land area in the priority KBAs is sufficiently protected (see Table 12.5). Another 45 percent of the land area is only partially protected, leaving 44 percent of the area unprotected. Even the 16 fully and partially protected KBAs confront management challenges, often lacking management plans, basic infrastructure and equipment, and sufficient staffing. New threats multiply the pressure for managers.

Table 12.5. CEPF Priority KBAs under Legal Protection

	Protected[1]	Partially protected	Unprotected	Total
Number, percent of KBAs	4 (11%)	12 (33%)	20 (56%)	36
KBA area (ha), percent of total	398,457 (12%)	1,517,022 (45%)	1,483,537 (44%)	3,399,016

[1] Scoring: Protected: >80% of KBA overlaps a public protected area; Partially: 10-80% overlap; Unprotected: <10% overlap.

Increasing management capacity of existing protected areas and bringing those unprotected areas under legal designations compatible with conservation in order to mitigate key threats and to create local support for conservation are key objectives of this strategic direction. Working with indigenous groups and local people to secure land tenure and defend their legally authorized self-governance that allows traditional land uses compatible with biodiversity conservation is also an important strategy. Planning for climate change resilience will be sought in site-based grants.

Furthermore, it is well recognized that local people must play a central role in supporting conservation. Helping local communities derive tangible benefits from biodiversity conservation in and adjacent to priority KBAs is essential, by engaging them in management decision making and by cultivating opportunities for them to derive income and access to public services. Payment for ecosystem services schemes are emerging as important means of funding conservation in several hotspot countries.

1.1 Support preparation and implementation of participatory management plans that promote stakeholder collaboration in managing protected KBAs.

CEPF will fund civil society organizations to work with their government counterparts, communities, private sector and other stakeholders to create, review, update and implement participatory management plans. CEPF will seek to catalyze funding to support traditional protected areas management activities. It will help create partnerships and participatory mechanisms by which local communities located in and around the borders of these areas are engaged in management efforts by, for example, creating and consolidating stakeholder management committees. This investment priority also will integrate climate change adaption and resilience into management planning, by funding assessments to determine potential climate change impacts on individual KBAs and developing and mainstreaming action plans that build resilience. It will seek to leverage climate change funding from other donors to implement resiliency plans.

1.2 Facilitate the establishment and expansion of indigenous, private, and subnational reserves, and multi-stakeholder governance frameworks for conserving unprotected and partially protected KBAs.

This investment priority will target the 32 priority KBAs that are currently unprotected or only partially protected. Funding will be available to advance stakeholder consultations, technical and legal processes, and outreach to achieve designation of sub-national, indigenous, communal, private and municipal reserves or other protected area designations to promote conservation. Particular attention will be given to sites where there is already a commitment to advance protection by local governments and stakeholders. In conjunction with the establishment of new protected areas, CEPF will encourage development of management plans and mechanisms for collaborative decision-making (*e.g.,* protected areas committees) and participatory management arrangements.

1.3 Strengthen land tenure, management, and governance of indigenous and Afro-descendant territories.

Many priority KBAs overlap or adjoin indigenous or Afro-descendant territories, with communities directly dependent on natural areas for their livelihoods. CEPF will support indigenous and Afro-descent groups in their efforts to strengthen protection and management of priority KBAs in ways that contribute to conservation and to human well-being. CEPF will support actions to strengthen and clarify traditional tenure and territorial rights, develop life plans ("*planes de vida")* incorporating biodiversity components and implementing targeted activities, help set aside sites for preservation, and strengthen mechanisms for collaborative decision-making and participatory management.

1.4 Catalyze conservation incentives schemes for biodiversity conservation for local communities.

CEPF will catalyze approaches that provide direct incentives for the conservation of biodiversity to local communities. CEPF will facilitate processes for communities to apply for, receive and remain in conservation incentive programs such as *Socio Bosque*. To help expand the benefits from these schemes, CEPF will support CSOs to work with communities to establish and maintain conservation incentive programs. Activities will include community outreach and capacity building, management planning and execution, and collaborating with public agencies responsible for the schemes to facilitate community access.

Strategic Direction 2. Mainstream biodiversity conservation into public policies and development plans in seven corridors to support sustainable development, with a focus on sub-national governments.

The governance of natural resources in the Tropical Andes has increasingly been decentralized to provincial, departmental, state, and municipal governments. Although the speed and nature of this process have varied, with challenges arising from weak technical capacity and funding limitations, the wherewithal of subnational governments to engage in territorial planning and environmental management is growing. Innovative experiences involving multiple stakeholders in land-use planning, some supported previously by CEPF, are serving as useful models for participatory governance that can be expanded and replicated. CEPF recognizes the importance of integrating biodiversity considerations into land-use and development planning, implementation, and monitoring and will support actions geared towards providing better information, effective outreach, and policy support. Given the threat of climate change, maintaining connectivity in corridors is of critical importance for ensuring resilient ecosystems.

Furthermore, securing long-term, public-sector funding for conservation remains a significant challenge for many corridors. Fortunately, new opportunities are emerging that show potential for funding biodiversity conservation and sustainable resource management, including compensation for ecosystem services and development of user fees with benefit sharing. Public and international financing for agriculture, disaster prevention, climate change, tourism, and infrastructure development are potential sources for conservation funding. Innovative mechanisms are needed to dramatically increase public and private-sector support and/or redirect existing sources towards biodiversity-compatible development.

2.1 Support land-use planning and multi-stakeholder governance frameworks that create shared visions for integrating biodiversity conservation and ecosystem services into corridor-level development.

CEPF will support civil society organizations collaboration with governments and other stakeholders to create the planning and governance frameworks necessary for conservation to take place at the landscape scale in the seven priority corridors. Grants may support activities such as developing and applying land-use zoning or territorial planning, supporting capacity building exercises, building consensus and coordination among diverse stakeholders around these processes, and assisting to create legal mechanisms (*e.g.*, ordinances, decrees) that formalize these commitments. CEPF will encourage the integration of climate change adaptation, the KBAs and IUCN Red Listed species into these efforts.

2.2 Integrate biodiversity objectives into development policies, programs, and projects that impact resource use, including climate change, agricultural development, and water resources management.

Rural development programs that depend on environmental quality (*i.e.*, water resources management, climate change, natural disaster prevention, agriculture, and public health) present important opportunities to create synergies and to leverage benefits for human welfare and biodiversity conservation. To forge stronger linkages between biodiversity conservation and these development programs, CEPF will support technical assistance and outreach to policy makers and program managers to help integrate biodiversity considerations into public programs shaping the land use in the corridors. Activites may include information generation, technical assessments, capacity building, and strategy development dedicated to integrating the conservation outcomes into rural development policies, direct outreach and information dissemination to decision makers, and support for public consultation as these policies and programs are designed and implemented. Efforts may also include outreach to the donors of these programs to adopt guidelines favorable to biodiversity conservation.

2.3 Promote traditional and innovative financial mechanisms for conservation, including payments for ecosystem services, leveraging of rural and micro-credit, mainstreaming biodiversity into public climate change programs, and compensation mechanisms to mobilize new conservation finance.

CEPF will seek to mobilize new commitments from subnational and national governments to focus more equitably and strategically on the high priority and under-resourced KBAs and corridors. CEPF will collaborate with the Andean environmental trust funds, national conservation incentive programs, and forest carbon initiatives to leverage funding. Collaboration in the form of information sharing and development of investment co-strategies will be sought. CEPF will also seek to mainstream the conservation outcomes into payments for ecosystem services, particularly for water resources, and for adaption and mitigation climate change funding, to focus on outreach to those stakeholders and donors funding climate change plans, policies and projects. CEPF will also encourage grantees to leverage CEPF-funded climate change adaption and resilience activities.

CEPF will also focus on integrating the conservation outcomes in existing rural credit schemes, creating biodiversity-friendly microcredit vehicles, green bonds that deploy capital for rural investments and compensation and payment-for-ecosystem services mechanisms. CEPF may provide support for initiatives bringing together private sector, CSOs and governments to analyze, design and generate multi-stakeholder commitment to these sorts of innovative mechanisms. CEPF will foster partnerships and support the design of these mechanisms with an emphasis on highest priority KBAs. CEPF cannot provide funding specifically to capitalize trust funds or make incentive payments. Key activities for CEPF grants may support stakeholder engagement, design and establishment of financial mechanisms, planning and prioritization of financing needs for KBAs, design and implementation of fundraising strategies and support to local stakeholders to access and maintain funding from existing financing mechanisms. CEPF will also support dissemination of experiences from successful cases and efforts to leverage interest in CEPF priorities from other donors and funding sources.

Strategic Direction 3. Promote local stakeholder engagement and the integration of social and environmental safeguards into infrastructure, mining and agriculture projects to mitigate potential threats to the KBAs in the seven priority corridors

Given the potential of large mining, infrastructure and agriculture projects to permanently degrade habitat and environmental quality in the KBAs and conservation corridors, CEPF will dedicate a separate strategy direction to integrating social and environmental safeguards into these projects. The profile recognizes that private companies, governments, and donors are deploying hundreds of billions of dollars for large investments in infrastructure, which are orders of magnitude more than funding for biodiversity conservation and environmental protection. National governments view these large projects as key components for national development across the hotspot. For those projects with weak environmental and social safeguards, local communities and civil society organizations view them as existential threats. Effective engagement of informed stakeholders at all stages of infrastructure and extractive industry development is essential to avoid, mitigate, and compensate for the negative impacts, with proactive integration of biodiversity consideration more likely to reduce conflict and avoid grave impacts over the short and long run.

Given the region's reliance on infrastructure and extractive industries, models for integrating local participation and environmental and social safeguards need to be developed to demonstrate the benefits to the sustainability of these large investments. Information on the economic, environmental, and social benefits of stakeholder participation and safeguards integration can help build constructive approaches to ensure the sustainability. Working with key stakeholder groups to encourage the social and environmental sustainability of those projects that directly and indirectly impact the KBAs and relevant ecosystem services will be a high priority for CEPF.

3.1 Build local capacity and facilitate public consultation and alliance building in the assessment, avoidance, mitigation, and monitoring of environmental impacts of large development projects that pose a direct or indirect risk to the KBAs.

Local communities and civil society organizations are important stakeholders that often lack basic knowledge of the potential impacts of large development projects as well as experience in engaging constructively with the planners and implementors of these investments. CEPF will work with local civil society groups to help them and their constituency play a meaningful role in the design, implementation and monitoring of the projects that impact their communities and ecosystems. A high premium will be placed on ensuring strong community engagement by funding capacity building, constructing multi-stakeholder dialogue and processes, and supporting community and third-party monitoring of environmental and social impacts of these projects. Funds may be channeled to help local organizations actively engage in environmental impact assessment processes, including the identification of potential impacts and negotations to avoid and/or mitigate them. Ensuring that the provisions of the impact assessments are implemented and monitored during and after the construction of the project will also be critical to avoid any unplanned impacts.

3.2 Encourage constructive approaches with the private sector to promote environmental and social sustainability of infrastructure, mining, and agriculture projects through partnerships between civil society groups, the private sector, and international investors.

CEPF will encourage collaboration with the private sector to help integrate environmental and social safeguards and sustainability into large-scale mining and infrastructure development that have direct and indirect impacts strategic sites in the corridors. CEPF will support the analysis and dissemination of information to ensure that the KBAs and corridors are not threatened by incompatible development. It also may help generate information on the economic, environmental, and social benefits of stakeholder participation and safeguards integration to promote constructive approaches to ensure the sustainability. Civil society groups may work directly with private companies to help conceptualize, design, implement, and monitor actions to avoid, mitigate, and compensate for environmental and social impacts. Examples of efforts to be promoted may include setting aside corridors of natural habitats in mining areas and along roads, controlling access points to prevent colonization on fragile lands, and carefully managing run-off and waste into groundwater and rivers.

3.3 Integrate biodiversity objectives into development policies, programs, and projects related to mining, infrastructure, and agriculture.

The role of government in overseeing the development, financing, and implementation of infrastructure projects is critical to ensure environmental and social sustainability. To assist with integrating biodiversity considerations into planning such works, CEPF may support technical assistance in a variety of ways, including analysis to identify the potential environmental and social impacts and their costs/benefits of individual projects, to guidance to develop and disseminate best practices in integrating conservation and social considerations into planning, implementing and monitoring these projects. CEPF may also support multi-stakeholder dialogue to ensure participation in the development of such projects, policies, or programs.

Strategic Direction 4. Promote and scale up opportunities to foster private sector approaches for biodiversity conservation to benefit priority KBAs in the seven corridors

It is well recognized that biodiversity outcomes for the KBAs are frequently determined by factors originating outside their boundaries. The seven corridors that encompass the priority KBAs are interspersed with multiple-use productive agricultural and forest landscapes under diverse ownership, which makes the private sector a critical stakeholder in determining land use. Furthermore, the private sector is increasingly at the forefront of stimulating environmental and social sustainability. Private sector voluntary mechanisms (*i.e.*, codes of conduct, standards and certification) and responses to market incentives that require social and environmental sustainability standards in the Andes, Europe, Japan, and the US are creating important opportunities for the kinds of socially responsible conservation projects that CEPF partners can deliver.

Beyond individual initiatives, greater attention is needed to integrate biodiversity considerations within private sector activities to scale, so that environmental and social sustainability are built into the common practice of large segments of the private sector. Demonstration projects and the dissemination of successful efforts in the hotspot and other countries can raise awareness within

Andean firms of potential options to pursue. Piloting, commercializing, and scaling up products compatible with conservation in the KBAs can help guide a more sustainable development path for the Andes. Ramping up and leveraging private sector engagement and funding for biodiversity represents a key opportunity to support sustainable land-use practices.

4.1 Promote the adoption and scaling up of conservation best practices in enterprises compatible with conservation to promote connectivity and ecosystem services in the corridors.

CEPF will also support civil society organizations working in KBAs and their buffer zones on those enterprises that provide direct benefits for conservation and/or demonstrate the reduction of threats directly impacting the KBAs. The focus will be on land uses that represent both key drivers of biodiversity loss and important opportunities for improvement, agroforestry systems such as coffee, and on innovative conservation-based products and enterprises that demonstrate social, economic benefits and build resilience to climate change. Grants may support civil society organizations to work with rural producers, associations or extension agencies to develop and disseminate technologies and best practices. CEPF may also help to build voluntary commitments to sustainable production and to improve market access and links for biodiversity-compatible products. CEPF will also support civil society organizations working with exemplary and promising ecotourism initiatives that include effective mechanisms linking revenues and benefits for local communities.

4.2 Encourage private sector partners and their associations to integrate conservation into their business practices and to implement corporate social responsibility policies and voluntary commitments.

CEPF will support civil society partners that work directly with those strategic companies and industries and their associations that have a presence in the corridors and that are committed to developing and fulfilling guidelines, standards, and policies that include biodiversity objectives. Areas of particular focus may include agriculture, forestry and tourism.

CEPF may fund efforts to raise awareness and understanding of corporate leaders and technical staff of effective approaches to incorporate biodiversity conservation considerations and opportunities. Facilitating dialogue, disseminating successful approaches and best practices, and assisting to operationize improved environmental practices are among the activities eligible for CEPF support. Within strategic industries, CEPF will support technical assistance to integrate biodiversity conservation into business and production practices, strategies, and policies.

At a site level, CEPF may also work with private sector to help plan and implement demonstration projects where co-financing is available and where potential to scale up exist. CEPF will facilitate civil society, communities, and land owners to take advantage of new opportunities for sustainably sourced products and other initiatives based on sustainable resource management to benefit biodiversity.

4.3 Leveraging private-sector financing schemes, such as carbon projects and green bonds that benefit the conservation outcomes.

The Tropical Andes remains an attractive venue for private sector funding in several respects. Several models have been tested in the hotspot, including forest carbon projects, that hold promise for replication and scaling up. In addition, green bonds are emerging internationally as another financing modality for environmental protection. CEPF will co-finance the preparation and marketing of carbon project proposals, to include required technical studies, capacity building to local stakeholders, and marketing to private sector buyers, to attract financing for forest management, conservation, and income generation to benefit the CEPF conservation outcomes. CEPF will also help to introduce innovative financing tools, such as green bonds, to explore opportunities for adoption. CEPF will invest in those areas that can demonstrate that key local governance conditions are in place for success.

Strategic Direction 5. Mainstream conservation action plans and outcomes to safeguard globally threatened species.

The ecosystem profile demonstrates that remarkably limited funding is available for species-level conservation from national and international donors. Landscape-scale approaches to conservation, as well as engagement in political processes and the private sector aimed at drivers of habitat destruction, are addressed by other strategic directions. However, addressing other threats, such as the spread of the chytrid fungus for amphibians, and supporting population recovery plans remains a high priority not considered elsewhere in the investment strategy.

The ecosystem profile also reveals major information gaps that fundamentally limit understanding of the state and location of the Tropical Andes' threatened species and habitats. For instance, while the Andes ranks number one for plant diversity, very little has been assessed for the taxonomic group. Even those plant groups that serve as important indicators of ecosystem health within emblematic Andean habitat have not been assessed and therefore are significantly under-represented in the KBAs and threatened species lists. Because reptiles and freshwater species are only being assessed in 2014 and 2015, the conservation outcomes do not consider these taxonomic groups or their habitats. The consultation workshops also reveal that many critically important areas of the hotspot have yet to be surveyed and that pronounced gaps in basic understanding of the large hotspot remain. Ensuring a more robust baseline for biodiversity conservation is essential, particularly in those sites where large-scale development projects are planned.

This strategic direction responds to these priorities by focusing on IUCN Critically Endangered or Endangered species and on high-priority information gaps. Emphasis will be put on addressing the highest priority data gaps considered essential for conservation prioritization, planning, implementation, and monitoring. Emphasis will also be placed on mainstreaming the products of this strategic direction into public policies and programs, in recognition of the limited impact that CEPF alone can have in light of the large need.

5.1 Prepare, help implement, and mainstream conservation action plans for the priority Critically Endangered and Endangered species and their taxonomic groups

To achieve species outcomes, CEPF will support the development and implementation of conservation plans that focus on the 171 Critically Endangered and Endangered species found in the priority corridors (Table 12.4; see species listed with an asterisk in Appendix 4). Special emphasis will be put on conservation measures where habitat protection alone is insufficient to safeguard a species. For amphibians, CEPF will support the protection of remnant populations of species that have suffered population declines and introduce biosecurity measures to prevent the spread of chytrid fungus to at risk populations. Compelling projects that link actions across multiple sites to achieve landscape-scale results will encouraged. To increase the availability of sustainable funding, CEPF will support efforts to institutionalize and leverage financing and support, by supporting the adoption of species conservation strategies in subnational and national conservation priorities, conducting outreach to government decision makers and donors, developing fundraising strategies and creative approaches to engage the private sector.

5.2 Update KBA analysis for mainstreaming to incorporate new AZE sites and Red Listing of reptiles, freshwater species and plants, based on addressing several high priority information gaps.

CEPF will seek to address the highest priority data gaps considered essential for conservation prioritization, planning, implementation, and monitoring. A high premium will be put on mainstreaming into subnational and national conservation plans and strategies the products of this investment priority.

CEPF will support alliances to digitize existing biodiversity data sets, including digital range information, publicly available to inform future prioritization exercises and relevant environmental policy. CEPF will also support efforts to assess priority plant groups that occur in the hotspot, using the IUCN Red List categories and criteria at the global, not national level. Priority plant groups will be those that reach their center of diversity in the hotspot and are strong indicators of ecosystem health for the Andes' unique habitats. Among the groups to be considered for Red Listing include those characterizing the high elevation vegetation such as the iconic, highly endemic and endangered frailejones (*Espeletia*), members of the heath family (Ericaceae), pineapple family (*Puya*), cushion plants (*Azorella*) and other páramo and puna species.

CEPF will respond to the challenge of having large data gaps by supporting the development of a strategy to prioritize those locations that have limited or no field inventory work, but where conditions are favorable for high biological values and where existing or impending threats are severe enough to put species at risk extinction. Such sites exist mostly in Peru and Bolivia.

CEPF will updated the KBAs of Tropical Andes Hotspot to incorporate newly available data on new sites, the IUCN Red Listing of reptiles, freshwater and plant species, and new AZE sites identified in Peru. CEPF will support efforts to standardize KBA delineation and nomenclature, including elimination of overlaps and revision to comply with forthcoming new IUCN KBA standards. It will be of paramount importance to ensure this information is disseminated to sub-national and national decision-makers for mainstreaming.

Strategic Direction 6. Strengthen civil society capacity, stakeholder alliances and communications to achieve CEPF conservation outcomes, focusing on indigenous, Afro-descendent and mestizo groups.

Andean civil society groups, particularly those sited locally in the KBAs and corridors, universally report the importance of strengthening their management, administration and fundraising in order to improve their viability and effectiveness over the long term. Many local and national civil society groups face significant budget shortfalls that limit their ability to serve as local and national environmental champions for globally important sites, corridors, and countries. Those civil society groups representing indigenous and Afro-descent groups and their governing councils face significant capacity shortfalls that limit their ability to manage and sustainably develop the territories they govern, which collectively cover more than half the hotspot.

Civil society groups also often face fragmented and/or difficult to access to basic information, knowledge and experience to deal with common threats and challenges outside of local or national settings. Opportunities to communicate with other conservationists within countries are very limited. Collaboration and communications across national boundaries are few, and they are virtually non-existent across the entire hotspot. Stakeholders also underscored the need for their improved capacity in communications to increase their effectiveness. The kind of progress sought by CEPF in its investment strategy requires innovative, forward thinking and effective communications approaches that can get environmental messages out beyond the conservation community, to decision makers, the private sector, and public more broadly.

6.1 Strengthen the administrative, project management, and fundraising capacity of civil society organizations and indigenous and Afro-descendent authorities to promote biodiversity conservation in their territories.

CEPF will help strengthening those organizations that have an important role to play in achieving CEPF's strategic directions by supporting holistic, organization-wide approaches to build institutional capacity rather than directing funds toward selected staff and their capacity needs. In addition, CEPF will dedicate funding specifically to those indigenous and Afro-descent authorities that play a strategic role in achieving CEPF's investment strategy, by supporting organizational-wide institutional building that will allow these authorities to promote the sustainable development of their lands and to achieve financial sustainability. CEPF capacity building packages will be based on the CEPF civil society tracking tool. Investments may support the development of an organizational strategic plan, strengthening financial management systems, and preparation and implementation of a fund raising strategy.

6.2 Enhance stakeholder cooperation, networking, and sharing of lessons learned to achieve CEPF's conservation outcomes, including efforts to foster hotspot-wide information sharing.

Cutting across all the strategic directions, CEPF will support multi-sectoralcollaboration through the establishment and strengthening of alliances dedicated to conserving one or a cluster of KBA or an entire corridor with a view toward developing and implementing conservation strategies. In addition, CEPF will support information sharing networks dedicated to thematic priority within the investment strategy, such as infrastructure development, ecosystem services, sustainable financing, species conservation, or environmental communications. CEPF will put a special emphasis on catalyzing cost-effective, hotspot-wide networking and collaboration among civil society, to include groups also from Argentina, Chile and Venezuela**.**

6.3 Strengthen capacity in communications of CEPF partners to build public awareness of the importance of the conservation outcomes.

CEPF will improve capacity of Andean civil society in communications to achieve the strategic directions. Opportunities may include training exercises to engage with various media outlets, development of communications tools to benefit the Andean conservation community, and networking between CEPF partners and journalists covering the KBAs, corridors, and relevant thematic priorities. CEPF will also support innovative communications approaches, for example through the use of social media, to reach new audiences. Leveraging existing resources and building partnerships with local, national, and international media, journalists, and public relations firms will be strongly encouraged.

6.4 Pilot and scale up promising approaches for the long-term financing of local and national civil society organizations and their conservation missions.

CEPF will help to pilot and scale up new approaches to secure diversified and sustainable funding sources for those organizations working in the priority KBAs and corridors, to reduce their dependency on international funding. Efforts may include marketing sustainably produced products and services, building memberships, crowd sourcing on the internet, sponsoring special fund raisers, and explanding alliances with the private sector, development foundations, and wealthy individuals.

Strategic Direction 7. Provide Strategic Leadership and Effective Coordination of CEPF Investment through a Regional Implementation Team

CEPF will implement its grant program in close collaboration with a Regional Implementation Team (RIT) to be located in the Tropical Andes Hotspot. The RIT will help promote and manage grant-making process, undertake key capacity-building, maintain and update data on conservation outcomes. It also will provide leadership to promote the overall conservation outcomes agenda to government and other stakeholders. The detailed terms of reference for the RIT can be found on CEPF's website: www.cepf.net.

7.1 Operationalize and coordinate CEPF's grant-making processes and procedures to ensure effective implementation of CEPF's strategy throughout the hotspot

Guided by the CEPF investment strategy, the RIT will work closely with the CEPF Secretariat to support grantees through CEPF's grant-making processes for both large and small grants. For large grants (over $20,000), the RIT will assist grantees and the CEPF Secretariat in receiving and processing grant applications, ensuring compliance with CEPF policies, and facilitating on-time and accurate grantee and portfolio reporting and monitoring. The RIT leads the solicitation of proposals and their review, from sending out calls for proposals to establishing review committees to making final recommendations. It also reporting and monitoring, including data collection on portfolio performance, ensuring compliance with reporting requirements, ensuring that grantees understand and implement safeguards policies, and reviewing reports. It also includes visits to grantees and follow-up capacity building for effective project implementation.

The RIT will manage CEPF's small grants (less than $20,000), including budgeting, processing proposals, and drafting and monitoring contracts. Small grants play an important role in the CEPF portfolio. These grants help fulfill the strategic directions, to serve as planning grants and to engage local and grassroots groups that may not have the capacity to implement large grants.

At the same time, the RIT will develop as needed collaborative arrangements with government departments, universities and other organizations that have responsibilities or resources important to the overall implementation of the program. Coordination with other grant-making may also create opportunities for joint grant making or capacity building.

7.2. Build a broad constituency of civil society groups working across institutional and political boundaries toward achieving the shared conservation goals described in the ecosystem profile

The conservation outcomes identified in the ecosystem profile are well aligned with conservation goals and vision of the Andean conservation community. The RIT is in an unique position to help steward that vision forward, to bring CSOs, the government, and the private sector together to work seek common objectives and to work collaboratively in achievement of the ambitious goals of this profile.

7.3 Engage governments and the private sector to mainstream biodiversity into policies and business practices.

The RIT will support civil society to engage with government and the private sector and adopt their results, recommendations, and best practice models. The RIT will engage directly with private sector partners and ensuring their participation in implementation of key strategies. It also includes facilitating the creation or strengthening of conservation-oriented networks. Action to improve policies, projects, and programs for specific KBAs and corridors is covered in the preceding strategic directions. In addition to these site-, species- and locality-specific actions, CEPF and the RIT will seek opportunities to promote conservation outcomes as an agenda for conservation in the hotspot at national and regional levels. Engagement with major conservation organizations and international agencies working in the hotspot should aim to mainstream conservation outcomes into their strategies and programs. International groups and agencies managing global datasets on conservation, such as IUCN, WCMC, and the CBD secretariat, also need to be kept informed of changes and improvements in the definition of conservation outcomes. Finally, national and international networks of private sector companies, certification authorities, and industries will also be engaged.

7.4 Monitor the status of biogeographic and sectoral priorities in relation to the long-term sustainability of conservation in the hotspot.

In parallel with the collection of additional data for specific conservation objectives by grantees , the RIT or other appropriate entities will monitor the overall status of KBAs and corridors to assess the impacts of the program provide information for conservation planning. Monitoring of land use change using satellite images is increasingly near-real-time and efficient (e.g. with the Global Forest Watch II). However, for impact on decision making, it is also important to use officially recognized data sources. Monitoring of this information, plus information on civil society, sustainable financing, the enabling environment, and responsiveness to emerging issues, will help CEPF report on the overall health of the hotspot and the need for continued donor engagement in the region.

7.5 Implement a system for communication and disseminating information on conservation of biodiversity in the hotspot.

The RIT will create a mechanism for the dissemination of monitoring results into government agencies and NGO networks, in conjunction with appropriate grantees. This should be aligned with official land-use-change monitoring. It will start first by disseminating the ecosystem profile, and serve as a node for future information exchange for stakeholders involved in conservation in the region.

12.3 CONSERVATION RESULTS

Success for CEPF will be defined at the end of the investment period when each of the seven corridors has made meaningful progress toward instituting those enabling conditions required for biodiversity and ecosystem services to be well conserved for the long term, in support of a sustainable path of economic development of the Tropical Andes hotspot. Through the investment strategy, CEPF will seek to achieve the following conservation results:

- The 36 priority KBAs will be under improved management. Sixteen protected areas within the KBAs will possess improved management capacity and have incentive schemes in place for community support of biodiversity conservation to ensure current and future threats can be mitigated. Five KBAs that currently lack legal protection will be under a form of legal land management designation that is compatible with conservation. Eight indigenous or Afro-descendent territories will have the planning frameworks and management and governance capacity in place to support improved community well-being and biodiversity conservation. Conservation incentives schemes will be demonstrated and scaled up for at least 100,000 hectares. As a result of these efforts, the level of threat will be reduced in nine KBAs by the end of the investment period.

- Successful models will have been piloted and scaled up to mainstream conservation and sustainable development into private sector initiatives. At least three industries associated with extractive industry, infrastructure, and agriculture which directly or indirectly impact the KBAs will have integrated participatory approaches to project design, implementation and monitoring to incorporate social and environmental safeguards. At least three enterprises that are compatible with conservation will have been at least piloted and even scaled–up initiatives to offer local communities living in or near priority KBAs opportunities for income generation.

- Three sub-national governments will have consensus-based land-use plans, policies and capacities in place to guide decision making in support of economic development which is compatible with biodiversity conservation. Adaptation to climate change for ecosystems will be mainstreamed into these plans.

- The public and decision makers will have sufficient awareness of, and support for, biodiversity conservation and the protection of natural capital to support mainstreaming of conservation outcomes. Five of media outlets will have better capacity to report on the importance of species, protected areas, and ecosystem services.

- Local communities located around the 36 priority KBAs will have the sufficient capacity to manage their land for biodiversity conservation and sustainable development, including at least eight indigenous or Afro-descendent territories.

- Mechanisms to ensure financial sustainability will be in place to ensure that CEPF results endure beyond the investment period. At least three financing mechanisms or programs will integrate biodiversity conservation and priority KBAs into their programming. CEPF will have introduced at least five innovative financing mechanisms for its civil society partners.

- At least 50 NGOs and civil society groups will have improved institutional capacity to achieve conservation outcomes. Andean conservation groups will have the capacity for hotspot-wide networking and information exchange, for meaningful collaboration on common priorities, and for ensuring their own financial sustainability.

- At least 25 Critically Endangered or Endangered species will have conservation action plans that are developed, in implementation, and adopted by a government entity or other donor to ensure its sustainability.

13. LOGICAL FRAMEWORK FOR CEPF INVESTMENT

Objective	Targets	Means of Verification	Important Assumptions
Engage civil society in the conservation of globally threatened biodiversity through targeted investments with maximum impact on the highest conservation and ecosystem services priorities	36 KBAs covering 3,399,016 hectares have new or strengthened protection and management. (G4) Subnational governments in seven corridors adopt and implement key tools for mainstreaming biodiversity conservation into their land-use and development planning.(G13) Eight indigenous and/or Afro-descendent territories and their communities under improved land management and governance. (G10) At least 20 partnerships and networks formed and/or strengthened among civil society, government, private sector, and communities to leverage complementary capacities and maximize impact in support of the ecosystem profile. (G22) At least 50 NGOs and civil society organizations, including at least 45 domestic organizations, actively participate in conservation programs guided by the ecosystem profile. (G20) At least three private sector businesses mainstream biodiversity and ecosystem services, with a focus on infrastructure, mining and agriculture. Conservation attention focused on at least 25 globally endangered species to improve their threat status.(G2) Three financing mechanisms or programs integrate biodiversity conservation and priority KBAs into their programming.(G14) The Tropical Andes ecosystem profile	Grantee and RIT performance reports Annual portfolio overview reports; portfolio mid-term and final assessment Protected Areas Tracking Tool (SP1 METT). IUCN Red List of Threatened Species.	The CEPF grants portfolio will effectively guide and coordinate conservation action in the Tropical Andes Hotspot. Stakeholder interest remains stable or increases with respect to working in partnership with civil society organizations to achieve the ecosystem profile conservation outcomes. Regulatory and institutional environment for conservation, environmental protection, and civil society engagement remains stable or improves. A decline in economic growth does not create new disincentives for conservation.

	influences and complements other donors' investment strategies. Change in the amount of CO^2 stored at CEPF invested site.(G11) Change in the amount of fresh water secured at CEPF invested sites and delivered to downstream users. (G12)		
Intermediate Outcomes	**Intermediate Indicators**	**Means of Verification**	**Important Assumptions**
Outcome 1. Improve protection and management of 36 priority KBAs to create and maintain local support for conservation and to mitigate key threats. **$3,500,000**	At least, 75% of the 16 existing protected areas in the priority KBA, totally 1.4 million hectares, experience on average a 15% improvement on the Protected Areas Tracking Tool. (G4) At least 15% of the 32 partially or unprotected KBAs under strengthened legal protection, totaling 220,000 hectares. (G5) Threat levels at least 25% of the 36 priority KBAs, covering 850,000 hectares, are reduced through locally relevant conservation actions implemented by local communities and park managers.(G6) At least 75% of local communities targeted by site-based incentive projects show tangible well-being benefits.(G10) Conservation incentives (ecotourism, sustainable coffee, payments for ecosystem services, conservation agreements, etc.) demonstrated for at least 100,000 hectares. (G8) Climate change resilience integrated into 100% of management plans developed.	Grantee and Regional Implementation Team performance reports CEPF Secretariat supervision mission reports Protected Areas Tracking Tool (SP1 METT). Human wellbeing monitoring reports.	Government agencies are supportive of civil society efforts to conserve KBAs and corridors. Indigenous and Afro-descendent groups that manage lands within KBAs are receptive to alliances with civil society organizations to strengthen their land tenure. Government policies will continue to provide for community, indigenous, and Afro-descendent management of natural resources. Suitable and sufficient funding sources will be available for conservation incentives models.
Outcome 2. Mainstream biodiversity conservation into public policies and development plans in seven corridors to	Subnational governments in seven corridors adopt key tools for mainstreaming biodiversity conservation into their land-use and development planning and policy.(G13).	Grantee and Regional Implementation Team performance reports CEPF Secretariat supervision	Subnational government authorities are receptive to working with civil society and to integrate conservation into their plans, policies, and projects.

support sustainable development, with a focus on sub-national governments. **$1,100,000**	Climate change resilience integrated into 100% of sub-national landscape plans developed. Seven subnational public agencies (one per corridor) demonstrate improved capacity to integrate biodiversity conservation into their operations and policies. Seven subnational governments increase their budgets to cover conservation priorities.	mission reports Subnational government reports and budgets.	Civil society organizations with sufficient capacity to engage in advocacy at the subnational decision-making level. Land-use conflicts will not prevent and land-use mapping at the priority sites. Non-conservation financing mechanisms will appreciate the business case for integrating biodiversity criteria into their programs. Local philanthropic institutions increase their support for environmental causes.
Outcome 3. Promote local stakeholder engagement and the integration of social and environmental safeguards into infrastructure, mining and agriculture projects to mitigate potential threats to the KBAs in the seven priority corridors. **$750,000**	Three mining and infrastructure or development projects for which civil society organizations are able to prevent or mitigate negative impacts on biodiversity. Mechanisms are instituted for three infrastructure projects to monitor their impacts after their construction to ensure their future attention to prevention of undesirable impacts.	Grantee and Regional Implementation Team performance reports CEPF Secretariat supervision mission reports Private sector reports	Private companies in key natural resource sectors appreciate the business case for better environmental and social practices. Sufficient civil society capacity to undertake biodiversity mainstreaming exists or can be built. Civil society organizations are committed to maintaining lines of collaboration and communication with the private sector.
Outcome 4. Promote and scale up opportunities to foster private sector approaches for biodiversity conservation to benefit priority KBAs in the seven corridors. **$1,150,000**	Private sector enterprises in ten priority KBAs provide income to local communities from biodiversity conservation. Three businesses and/or their associations influenced to better incorporate biodiversity objectives into their practices. Three private sector demonstration projects are scaled up in support of biodiversity	Grantee and Regional Implementation Team performance reports CEPF Secretariat supervision mission reports Private sector reports	Private companies in key natural resource sectors appreciate the business case for better environmental and social practices.

	conservation.		
Outcome 5. Safeguard globally threatened species **$1,000,000**	Ten species and/or taxonomic group conservation plans developed, implemented, and funded in collaboration with government, donors, and the private sector. Conservation attention focused on at least 25 globally endangered species to improve their threat status.(G2) Hotspot-wide Red List conducted for at least three plant groups to help assess the health of representative Andean habitat. KBA analysis updated to integrate new Red Listing data for reptiles, plants and freshwater species to ensure more comprehensive taxonomic coverage. Strategy to address sampling/inventory gaps in Peru developed, adopted, and implemented by the conservation community, government, and donors.	Grantee and Regional Implementation Team performance reports CEPF Secretariat supervision mission reports IUCN Red List species accounts. Donor reports	Drivers of threats to specific species declines can be addressed (such as preventing spread of the Chytrid fungus). Adequate capacity to implement species-focused conservation exists among civil society or can be built. Governments and donors increase their commitment to species conservation and financial support to implement species conservation action plans.
Outcome 6. Strengthen civil society capacity, stakeholder alliances and communications to achieve CEPF conservation outcomes, focusing on indigenous, Afro-descendent and mestizo groups. **$1,000,000**	At least 50 NGOs and civil society organizations, including at least 45 in conservation programs guided by the ecosystem profile.(G20) At least 20 partnerships and networks formed among civil society, government and communities to leverage complementary capacities and maximize impact in support of the ecosystem profile. (G22) Five innovative financing mechanisms demonstrated for civil society sustainable funding. (G14) Five of media outlets (newspapers, radio and television stations, magazines) increase their capacity and reporting on the importance of species, protected areas, and ecosystem service values. One communication mechanisms created and	Grantee and Regional Implementation Team performance reports CEPF Secretariat supervision mission reports CEPF civil society tracking tool Media tracking of stories on conservation outcomes in targeted outlets.	The operating environment for civil society will remain constant or improve across the hotspot. Key media outlets demonstrate interest in working with civil society to improve conservation reporting.

	functioning to share information among CSOs throughout the hotspot.(G22)		
Outcome 7. A Regional Implementation Team provides strategic leadership and effectively coordinates CEPF investment in the Tropical Andes Hotspot **$1,500,000**	At least 50 civil society organizations, including at least 40 domestic organizations actively participate in conservation actions guided by the ecosystem profile.(G2) At least 30 civil society organizations supported by CEPF secure follow-up funding to promote the sustainability of their CEPF grants. At least 2 participatory assessments are undertaken and lessons learned and best practices from the hotspot are documented.	RIT performance reports CEPF Secretariat supervision missions and monitoring. Civil society organizational capacity tracking tool.	Qualified organizations will apply to serve as the Regional Implementation Team in line with the approved terms of reference and the ecosystem profile. The CEPF call for proposals will elicit appropriate proposals that advance the goals of the ecosystem profile. Civil society organizations will collaborate with each other, government agencies, and private sector actors in a coordinated regional conservation program in line with the ecosystem profile.
Strategic Funding Summary	**Amount**		
Total Budget:	$10,000,000		

14. RELATION TO CEPF MONITORING FRAMEWORK

The following table links the information compiled in this profile with the CEPF Monitoring Framework. Although CEPF has already made substantial investments in the Tropical Andes (see Chapter 1), the baseline for many of the indicators is zero to allow calculation of the impact that the current investment has on improving the conservation of species, KBAs and corridors.

Impact category	Sub-category	Indicator	Link to profile
Biodiversity - what changes in biodiversity status have taken place?	Species	Change in Red List Index	This indicator is measured using global IUCN Red List data. Baseline Red List data for threatened species in the Hotspot are provided in Appendix 4. Currently 51% of amphibians, 12% of birds, and 14% of mammals are threatened with extinction (Table 3.1). Any additional CEPF-supported assessment work of previously unassessed taxa (*e.g.*, plants, fishes, reptiles) would contribute to a more comprehensive Red List Index. CEPF has contracted with BirdLife to provide national Red List Indices to monitor this indicator.
		Change in threat levels of target species	Threat data specific to individual species is out of the scope of this profile.
	Sites	Change in habitat extent	The deforestation rate data provided in Table 8.3 can provide a baseline for the measurement of this indicator. CEPF has contracted with FERAL to provide consistent updates for this indicator.
		Change in number of hectares of KBAs with strengthened protection and management	Priority KBAs indicated in Table 12.1 are eligible for inclusion in the measure of this indicator, which will be calculated from grantee and RIT reports.
		Change in number of hectares of new protected areas	Currently 15,064,069 ha of the KBAs are under high legal protection (Table 4.13). Progress will be measured by compiling information from grantee and RIT reports.
		Change in threat levels of target sites	The analysis of vulnerability of KBAs presented in Chapter 4 provides a baseline for the measure of this indicator.
	Corridors	Change in habitat extent	The deforestation rate data provided in Chapter 8 can provide a baseline for the measurement of this indicator. CEPF has contracted with FERAL to provide consistent updates for this indicator.

Impact category	Sub-category	Indicator	Link to profile
		Change in the number of hectares in production landscapes managed for biodiversity conservation	It is impossible to calculate a current value for this indicator, but new projects that manage production landscapes for biodiversity conservation can be quantified by compiling information from grantee and RIT reports.
Human wellbeing - have people benefited from CEPF investment?	Direct benefi-ciaries	Change in the number of direct beneficiaries	The baseline is zero for this indicator. Chapter 3 indicates that currently the Hotspot is home to over 30 million people, representing the pool of potential direct beneficiaries of CEPF investments. Millions more people who live outside of the Hotspot but depend on ecosystem services such as water provided by the Hotspot. Progress on this indicator can be quantified by compiling information from grantee and RIT reports.
		Change in the number of communities directly benefitting	The baseline is zero for this indicator. Progress on this indicator can be quantified by compiling information from grantee and RIT reports.
	Indirect benefits	Change in the amount of CO_2e stored at CEPF invested sites	The estimated carbon storage of KBAs is listed in Table 4.16, and can be used as a reference for the calculation of this indicator. CEPF has contracted with FERAL to provide consistent updates for this indicator.
		Change in the amount of fresh water secured at CEPF invested sites and delivered to downstream users	Data on the value of KBAs for provisioning of freshwater for human consumption is provided in Chapter 4 (Figure 4.14 and 4.15), and can be used as a reference. CEPF has contracted with FERAL to provide consistent updates for this indicator.
Conditions for Sustainability - will any gains be sustained?	Regula-tory environ-ment	Change in the number of policies (legislative, regulatory or strategic) that include provisions for conservation management	Chapter 6 provides details about legal frameworks already in place for general environmental legislation, protected areas laws, land use, territorial planning and watershed conservation policies. Some countries have new, innovative regulations for offsets of infrastructure projects (Colombia) and participatory rights by indigenous communities (Ecuador, Bolivia, Peru and Venezuela). Additional progress supported by CEPF can be measured against this background.
	Long-term financing	Change in the number of sustainable finance mechanisms with improved management	Chapters 9 and 10 provide details on sustainable finance mechanisms that are in place: *Conservation Trust Funds*: Bolivia (1), Colombia (2), Ecuador (1), Peru (2) *Water Funds*: Colombia (3), Ecuador (5), Peru (1), Venezuela (1) *Validated REDD+ Projects*: Colombia (1), Ecuador (1), Peru (5) Additional progress supported by CEPF can be measured against this background.

Impact category	Sub-category	Indicator	Link to profile
		Change in the amount of funds housed in sustainable finance mechanisms	Chapters 9 and 10 provide details on the amount of funds housed in sustainable finance mechanisms. *Conservation Trust Funds*: Bolivia ($4 M), Colombia ($22.7 M), Ecuador ($1.6 M), Peru ($32.3 M) *Donor Commitments for REDD+ Finance*: Bolivia ($4.7 M), Colombia ($26.8 M), Ecuador ($35.5 M), and Peru ($71.3 M)
		Change in the financial performance of funds	No data were available on the performance of any sustainable finance mechanisms currently in place.
		Change in the timing of financial delivery of funds to conservation projects	No data were available on the timing of financial delivery of any sustainable finance mechanisms currently in place.
	Conserva-tion best practice	Change in the number of sites (protected areas) with improved management	The data provided in Chapter 10 on funding per hectare of protected areas provides a rough reference figure for current management capacity. Tracking of this indicator will depend on grantee submission of METT scorecards.
		Change in the number of best management practices	No data have been collected so far on best management practices. This indicator can be quantified in the future by compiling information from grantee and RIT reports.
Civil society - has civil society been strengthened ?	Individual organiza-tions	Change in the number and percent of local, national and regional CEPF grantees with improved organizational capacity	Table 7.9 provides baseline information of the institutional capacity (financial and human resources) of local, national and international NGOs currently operating in the Hotspot. Future capacity changes can be monitored with using grantee self-assessment with the Civil Society Tracking Tool.
	Collective group	Change in the collective civil society capacity at relevant scale	Table 7.10 provides some baseline data for this measure. Future capacity changes can be monitored using the Civil Society Collective Assessment Tool.
		Change in the number of networks and partnerships	Chapter 7 describes 42 networks that currently operate in the Hotspot.
		Change in the ability of civil society to respond to emerging issues	One of the components of this indicator is the availability of biodiversity monitoring information. IUCN Red List data used in Chapters 3 and 4 reveal that this information is available for limited taxonomic groups. An increase in the species and

Impact category	Sub-category	Indicator	Link to profile
			groups that appear on the IUCN Red List will indicate an increase in biodiversity monitoring information. A second component is the ability to monitor threats. As described in Chapter 8, two new technologies are now available to monitor forest loss: Terra-i and Global Forest Watch. Another tool, the Biodiversity Indicator Dashboard, is currently under development and will provide trend data for species status, deforestation, and ecosystem services (water and carbon). Information on the other components, adaptive management and the public sphere, are not yet available. Future changes to responsiveness can be monitored using the Civil Society Responsiveness Tracking Tool.

15. SUSTAINABILITY

CEPF will fund activities in the Tropical Andes Hotspot over a five-year period, but aims to ensure lasting achievements in biodiversity conservation. Ensuring the positive, long-term impact of this investment has been a key consideration in the definition of Strategic Directions and Investment Priorities (Chapter 12). Sustainability of CEPF support requires both that specific interventions funded be socially, politically and ecologically sustainable, and that activities supported be economically viable in the long-term. The former requires that Strategic Directions and Investment Priorities integrate sustainability considerations into the cycle of project support (including project design, funding decisions, implementation and evaluation). The latter requires that financial sustainability and mechanisms for long-term funding be a key emphasis of CEPF in the hotspot across its activities.

Several mechanisms can contribute to sustainability of CEPF investments:

- Institutionalization: Having conservation written into law and policy can have lasting impact long beyond a specific project or investment. The creation of protected areas or strengthening of indigenous tenure are perhaps some of the clearest examples, with even ‘paper parks’ often being a vital first step towards long-term protection (Nelson and Chomitz 2011, Bruner *et al*., 2001). Integrating biodiversity considerations into regulations and laws (*e.g*., for licensing and siting decisions, as a condition for public investment or credit) or into codes of conduct or voluntary standards can continue to influence positive biodiversity outcomes and formalize societal commitments to conservation. It must however be noted that the environmental laws and regulations of the region are littered with unrealized good intentions – and that translating these formal pronouncements into real results requires a complement of one or various of the other key factors listed below.

- Commitment and social license: Conservation is obviously not a sectoral outcome determined solely by the environmental community. It requires a level of commitment from key stakeholders, including active support from advocates and beneficiaries of conservation as well as what has come to be known in other sectors (*e.g*., mining) as a social license to operate, *i.e.* acceptance or approval from other key affected stakeholders. Building commitment and social license through multi-sector dialogue, public-private partnerships and other mechanisms that build support and create breathing room for conservation is critical to long-term sustainability, and can involve a range of governmental, private and social institutions across sectors and scales.

- Benefits: Building commitment and social license also requires realizing benefits from conservation. Conservation usually involves significant costs and trade-offs. Identifying and maximizing opportunities for both conservation gains and other social and economic objectives is a key consideration for CEPF investment decisions, including among other biodiversity-compatible livelihoods activities and mechanisms for compensating provision of ecosystem services. These benefits are not solely economic; cultural, spiritual, aesthetic and recreational values play very important roles, as does concern for the welfare of future generations.

- Capacity: Achieving and insuring conservation gains for the future, beyond the cycle of CEPF support, will depend on solid institutional capacity. Undoubtedly much of this will need to be in the public sector, with its legal functions of governance and regulation, and CEPF will contribute indirectly to building that capacity through some training activities, multi-stakeholder dialogue and technical support from civil society organizations. But it is these last which have played an outsized role in conservation in the region in the last 25 years and that are the focus of CEPF support. Through support for specific activities for species, sites and corridors, and through broader capacity-building investments, CEPF will support organizations to enhance their institutional capacities – both technical and managerial – to remain effective advocates and executors of conservation actions.

- Long-term financing: Conservation is only rarely profitable in and of itself. Creative long-term finance from public, private and philanthropic sources is needed to sustain many conservation initiatives, especially management of protected areas. CEPF will emphasize opportunities where its finance can leverage and create the conditions for long-term financial commitments such as conservation-based enterprises, additional donor commitments, user fees, compensation for ecosystem services, endowments and public funding.

13.1 Strategic Directions and Sustainability

Each Strategic Direction includes investment priorities taking into account sustainability criteria along the lines described above, with the exception of Strategic Direction 6 (Provide strategic leadership and effective coordination of CEPF investment through a regional implementation team) which is specifically geared to the needs of the CEPF five-year investment period.

Strategic Direction 1. Institutionalize and leverage support and financing for safeguarding globally threatened species by addressing major threats and information gaps	
Sustainability Criteria	**Mechanism**
Institutionalization	Conservation plans adopted and incorporated in national policies and programs, and by civil society networks
Commitment and Social License	Some focal species are charismatic and recognizable to the public providing a face for Andean conservation (*e.g.,* mountain tapir, spectacled bear, Andean cat,, flamingos, and *Polylepis* forests)
Benefits	Functioning ecosystems and the benefits they provide
Capacity	Strengthened operational and technical capacity of regional networks
Long-Term Finance	Development and implementation of fund-raising and sustainable finance strategies of civil society organizations.

Strategic Direction 2. Improve protection and management of 34 priority KBAs	
Sustainability Criteria	**Mechanism**
Institutionalization	Protected areas and indigenous territories with legal protection, clear tenure and formally adopted management plans.
Commitment and Social License	Strong stakeholder engagement in process of creating and management of conservation areas, including platforms for participation and emphasis on long-term stewardship by local communities, local governments and/or NGOs
Benefits	Focus on opportunities where high-priority KBAs are integrated with local development priorities, indigenous life plans and/or provide generate valued ecosystem services.
Capacity	Strengthened capacity of civil society organizations, communities and government agencies for management.
Long-Term Finance	Sustainable financial mechanisms and fundraising strategies in place for conservation areas and organizations

Strategic Direction 3. Integrate biodiversity conservation into development planning, policy and implementation in 5 priority corridors and corridor clusters to create incentives for conservation and the maintenance of ecosystem services, working with local governments and the private sector	
Sustainability Criteria	**Mechanism**
Institutionalization	Legally adopted land-use or territorial zoning plans.
Commitment and Social License	Consensus and shared vision amongst diverse stakeholders at the corridor level.
Benefits	Integration of KBAs with multiple-use strategies that integrate conservation and other land-uses and landscape level.
Capacity	Strengthened capacity of civil society organizations, communities and government agencies to engage in planning and development decision making.
Long-Term Finance	Sustainable production; public finance for corridor management

Strategic Direction 4. Seek opportunities for sustainable financing for conservation in five priority corridors and corridor clusters	
Sustainability Criteria	**Mechanism**
Institutionalization	Sustainable funding mechanisms to provide long-term financing for the conservation extended and made more widely accessible to CSOs.
Commitment and Social License	Facilitating processes for communities to apply for, receive and remain in conservation incentive programs through public payment for ecosystem services schemes.
Benefits	Enhanced for CSOs to implement actions to protect biodiversity and protected areas.
Capacity	Strengthened capacity and knowledge of civil society, government agencies, private sector and other stakeholders informs ongoing development and investment decisions.
Long-Term Finance	Mainstreaming of biodiversity considerations and financing mechanisms into land-use investment decisions.

Strategic Direction 5. Promote adoption of best practices for biodiversity in mining and infrastructure policy, planning and implementation in five priority corridors and corridor clusters	
Sustainability Criteria	**Mechanism**
Institutionalization	Biodiversity considerations and mechanisms incorporated into mining and infrastructure projects and public policies regulating these activities.
Commitment and Social License	Facilitating multi-stakeholder dialogue and negotiations to build consensus around conservation and development priorities.
Benefits	Enhanced knowledge and awareness of all stakeholders of benefits of biodiversity and protected areas.
Capacity	Strengthened capacity and knowledge of civil society, government agencies, private sector and other stakeholders informs ongoing development and investment decisions.
Long-Term Finance	Mainstreaming of biodiversity considerations and financing mechanisms into infrastructure and mining investment decisions.

Strategic Direction 6. Support communication and alliances of multiple stakeholders to strengthen biodiversity conservation at local, corridor and hotspot levels	
Sustainability Criteria	**Mechanism**
Institutionalization	Enhanced participation of civil society in formal processes and forums for stakeholder participation.
Commitment and Social License	Facilitating multi-stakeholder dialogue and negotiations to build consensus around conservation and development priorities.
Benefits	Dissemination and replication of best practices and successful examples of conservation and sustainable development.
Capacity	Strengthened managerial and technical capacities and skill sets both for individual organizations and regional networks.
Long-Term Finance	Development and implementation of fund-raising and sustainable finance strategies of civil society organizations.

13.2 CEPF Investment and Financial Sustainability

The CEPF investment strategy is designed to achieve sustainability both in terms of impacts (achievement of objectives relating to biodiversity and ecosystem conservation, civil society and development) and broader long-term financing to improve conservation outcomes in the hotspot. In addition to the specific mechanisms for long-term finance for Strategic Directions mentioned in the preceding section, CEPF will seek sustainability leveraging in all of its investments. Collaborating and coordination across CEPF's portfolio of investments with other funding sources will be necessary to ensure long-term continuity of progress. These funding sources include both those explicitly focused on environment and biodiversity outcomes (*e.g.*, environmental trust funds, GEF, environmental ministry budgets) as well as other funding sources for other sectors where effective integration of biodiversity and development objectives creates important synergies (*e.g.,* infrastructure investments, rural finance and credit).

ADDENDUM

As this profile went to press, the Peruvian Environmental Ministry released a revised map of AZE sites for the country. This spatial database adds new sites and corrects errors in the delimitation of previously recognized sites. The timeline for the production of the profile unfortunately did not allow for the extensive reanalysis of KBAs, corridors and priorities that would be required to incorporate this new information into the site outcomes for the Tropical Andes Hotspot. The reanalysis of KBAs described under investment priority 1.4 should include consideration for these Peruvian AZE sites along with other new information that becomes available in the next few years.

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APPENDICES

Appendix 1. In-country Experts Consulted for Socioeconomic, Political, and Civil Society Information

Country	Expert	Institution
Argentina	Alejandro Brown	Proyungas
Bolivia	Monica Ostria	Independent
Chile	Claudio López	Corporación Norte Grande
Colombia	César Monge	Fundación Natura
Ecuador	Sigrid Vasconez	EcoDecisión
Peru	Teddi Peñaherrera	Independent
Venezuela	Alejandro Luy	Tierra Viva

Appendix 2. Members of the Advisory Committee

Member	Institution
Maria Teresa Becerra	Independent
Maria Emilia Correa	TriCiclos
Marc Dourojeanni	Independent
Robert Hofstede	Independent
Miguel Saravia	Consortium for the Sustainable Development of the Andean Ecoregion (CONDESAN)
Pedro Solano	Peruvian Society for Environmental Law (SPDA)

Appendix 3. Methods for Calculating Site Irreplaceability and Vulnerability

This appendix provides additional detail on the development of indexes of site irreplaceability and site vulnerability and their use in the identification and delineation of new KBAs and scoring of all KBAs.

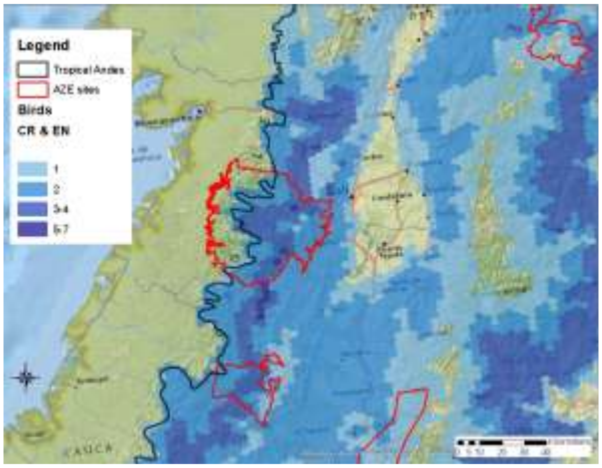
KBA Identification

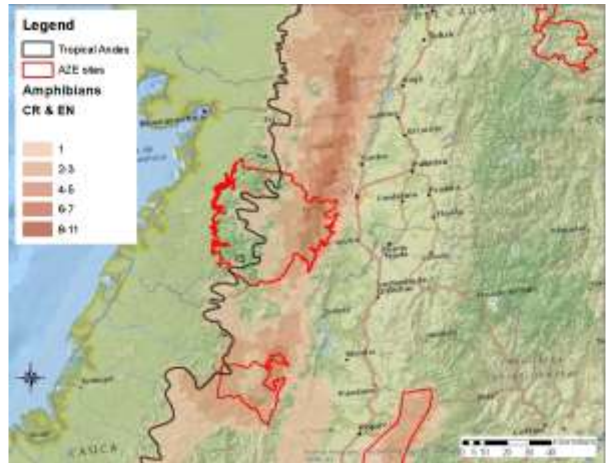
The methodological basis for KBA identification follows Langhammer *et al*. (2007). In the Tropical Andes Hotspot, most KBAs have already been delimited as Important Bird Areas (IBAs), identified by BirdLife partner organizations and collaborating organizations in each hotspot country, or Alliance for Zero Extinction (AZE) sites, defined as places that encompass the entire ranges of Endangered or Critically Endangered species (Ricketts *et al.* 2005). The criteria for delimiting IBAs and AZE sites are compatible to the KBA criteria. New KBAs were identified by focusing on areas where different lines of evidence suggest that there is high overlap of ranges of species that are the most threatened and have the smallest ranges, natural habitat still exists, but no IBA or AZE has been delineated. This required data on the global threat status of each species, the distribution of both globally threatened and/or range-restricted species and land use/land cover. While the distributions of many taxa in the Tropical Andes are known, their mapped expression varies from confirmed field observations to spatially-coarse range maps. Thus, proposed new KBAs were defined using the best available distribution data for mammals, birds, and amphibians, followed by expert review and validation procedures. Information on threatened reptiles and plants was less comprehensive due to the lack of IUCN Red List assessments or alternative digital databases, but was used where available.

KBAs were identified using measures of relative irreplaceability. In species conservation, irreplaceability commonly refers to the number of opportunities one has to conserve them. A highly threatened or narrowly distributed species may offer fewer opportunities for place-based conservation than for less threatened and/or more broadly distributed species. For species conservation, locations that support a given threatened and range-restricted species are therefore more irreplaceable than locations without that species. This approach underlies methods documented by Langhammer et al. (2007) with the identification of species with characteristics for inclusion in KBAs (Table 4.2). Likewise, sites supporting multiple threatened or range-restricted species offer efficient opportunities for species conservation. Thus the co-occurrence of threatened species with restricted ranges at a given site confers relatively high site irreplaceability (Margules and Pressey 2000).

As an example, Figure A3.1 illustrates one region near Cali, Colombia, where as many as seven Critically Endangered and Endangered birds and 11 Critically Endangered and Endangered amphibians overlap.

Figure A3.1. Example of Overlapping Ranges of CR and EN Birds and Amphibians near Cali, Colombia.





To account for sites that still meet the KBA criteria but could have been overlooked by previous assessments and therefore are not already designated as IBAs and AZEs a spatial analysis of the ranges of all threatened and restricted range species was used to identify places of high relative irreplaceability of threatened biodiversity. This method, described in detail in Appendix 3, highlighted areas where there is the most overlap of species that are the most threatened and have the smallest ranges, and where there is natural vegetation cover. These areas were reviewed at the stakeholder consultation workshops for verification of their biodiversity importance and to obtain recommendations for defining site boundaries for proposed KBAs.

After stakeholder workshops, these proposed KBAs were validated and their boundaries were refined using additional data sources. High-spatial resolution data on land use and land cover (Josse *et al.* 2009) were consulted to ensure that the proposed KBAs still had adequate habitat to support populations of the trigger species. Maps of existing management units were used to align KBA boundaries with protected area boundaries were appropriate. The proposed KBAs were also delineated to have no overlap with the IBAs or AZE sites.

The proposed KBAs were subsequently validated for KBA-trigger species (Critically Endangered, Endangered, Vulnerable and range restricted species) using field locality data and expert-derived habitat maps. This information was available for a subset of the species from previous collaborations between NatureServe and experts and natural history museums (Josse *et al*. 2013, Swenson *et al*. 2012). An additional source of locality data was provided by local experts who participated in the consultation workshops. KBAs with at least one verified point locality of a trigger species or with at least 70% of the extent of an expert-derived range map were considered validated. In addition, any proposed KBA that encompassed at least 70 percent of the mapped range of trigger species was considered validated because the area could qualify as an AZE site (if the range map corresponds to an Endangered or Critically Endangered species) under the irreplaceability criterion. The proposed KBAs that were validated are hereafter termed new KBAs, whereas proposed KBAs not meeting the validation criteria due to lack of trigger species range data are termed candidate KBAs. Candidate KBAs are not an official unit, although future research in a candidate KBA that documents the occurrence of species that meet the validation criteria would convert the area to a new KBA.

To ensure that the resulting set of KBAs (IBAs, AZE sites and new and candidate KBAs) was supported by stakeholders, the KBAs were compared with the results of national biodiversity prioritization exercises completed as part of National Biodiversity Strategies and Action Plans (NBSAPS). These strategies were available for Colombia, Ecuador and Chile. In all three countries the KBAs closely overlapped national priority areas. The Chilean strategy included a few additional areas, which were included as candidate KBAs as long as the criteria used for their designation as national priority matched those for delineating KBAs.

To explore the relative biodiversity value of KBAs, a scoring system was used to assess species threat status and irreplaceability in each KBA. The methods used to derive relative biodiversity value are explained in detail below; the results highlight areas where there is the greatest overlap of species that are the most threatened and have the smallest ranges, but where there is currently intact vegetation. KBAs with scores greater than 0.4 on a 0-1 scale were defined as having high relative biodiversity value. Two additional KBAs (Sierra Nevada de Santa Marta National Park in Colombia and Yungas Inferiores de Pilón Lajas in Bolivia) were included because they were strongly recommended by national experts and one (Sierra Nevada de Santa Marta National Park) was recently distinguished as one of the world's most irreplaceable protected areas for amphibian, bird and mammal species (Le Saouet *et al*. 2013). The resulting set of KBAs was further narrowed to include only those sites that made up at least 30% of the range of a Critically Endangered and Endangered species, or the entirety of the range of Vulnerable or restricted-range species. This final group of KBAs was defined as having high relative biodiversity value.

Measures of species level irreplaceability were derived from (a) the IUCN Red List status for the species and (b) the mapped range extent. Ten categories of range size for threatened and restricted range species were established, with the narrowest category being <2,000 km^2 and broadest being >50,000 km^2. An index was then established to score each species along a scale of 1 to 50, with the highest species irreplaceability score (50) applying to Critically Endangered species with range extent <2,000 km^2 and lowest (2) applying to non-threatened, range restricted species with 40,000 - 50,000 km^2 range extent. Table A3.1 illustrates the species irreplaceability index.

Table A3.1. Species Irreplaceability Index Values for the Tropical Andes Hotspot

	Species Irreplaceability Index Value			
Range Size Category (km^2)	**Critically Endangered**	**Endangered**	**Vulnerable**	**Range Restricted and Near Threatened, Least Concern, Data Defficient, or Not Evaluated**
< 2,000	50	40	30	10

Range Size Category (km^2)	Species Irreplaceability Index Value Critically Endangered	Endangered	Vulnerable	Range Restricted and Near Threatened, Least Concern, Data Defficient, or Not Evaluated
2,000 – 5,000	49	39	29	9
5,000 – 10,000	48	38	28	8
10,000 - 15,000	47	37	27	7
15,000 - 20,000	46	36	26	6
20,000 - 26,000	45	35	25	5
26,000 - 32,000	44	34	24	4
32,000 - 40,000	43	33	23	3
40,000 - 50,000	42	32	22	2
> 50,000	41	31	21	Not applicable

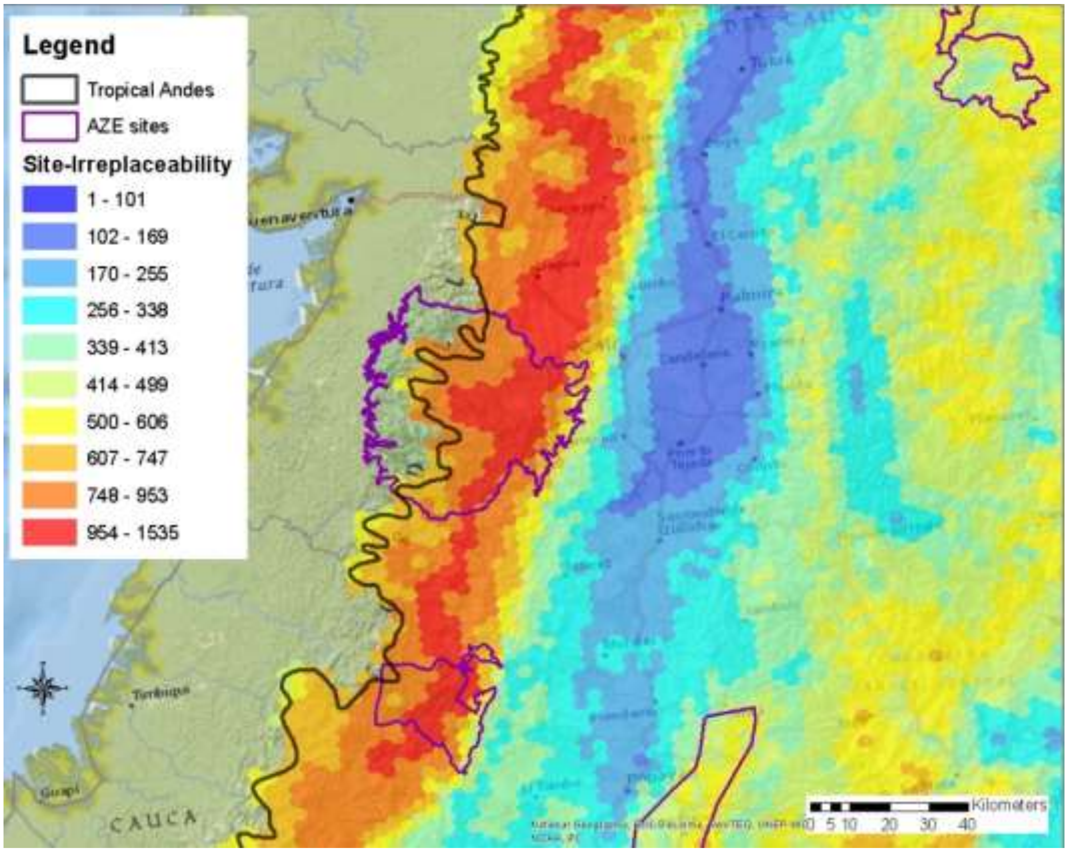
A grid of 13-km^2 hexagons was then created for the hotspot to establish a site (in this instance, a hexagon) irreplaceability index as the sum of the species index values of co-occurring species in each hexagon. Table A3.2 provides an example of how species irreplaceability index scores are combined to produce a site irreplaceability score for a given location (hexagon) in the hotspot.

Table A3.2. Example Site Irreplaceability Index Calculation Illustrated for One 13-km^2 Hexagon in the Hotspot

Species	IUCN Red List status	Species' range size (km^2)	Species irreplaceability index value
Species 1	Critically Endangered	450	50
Species 2	Critically Endangered	42,000	42
Species 3	Endangered	8,700	38
Species 4	Endangered	9,200	38
Species 5	Vulnerable	88,300	21
Species 6	Not Evaluated	2,900	9
Site Irreplaceability Score (sum of species irreplace-ability index values)			198

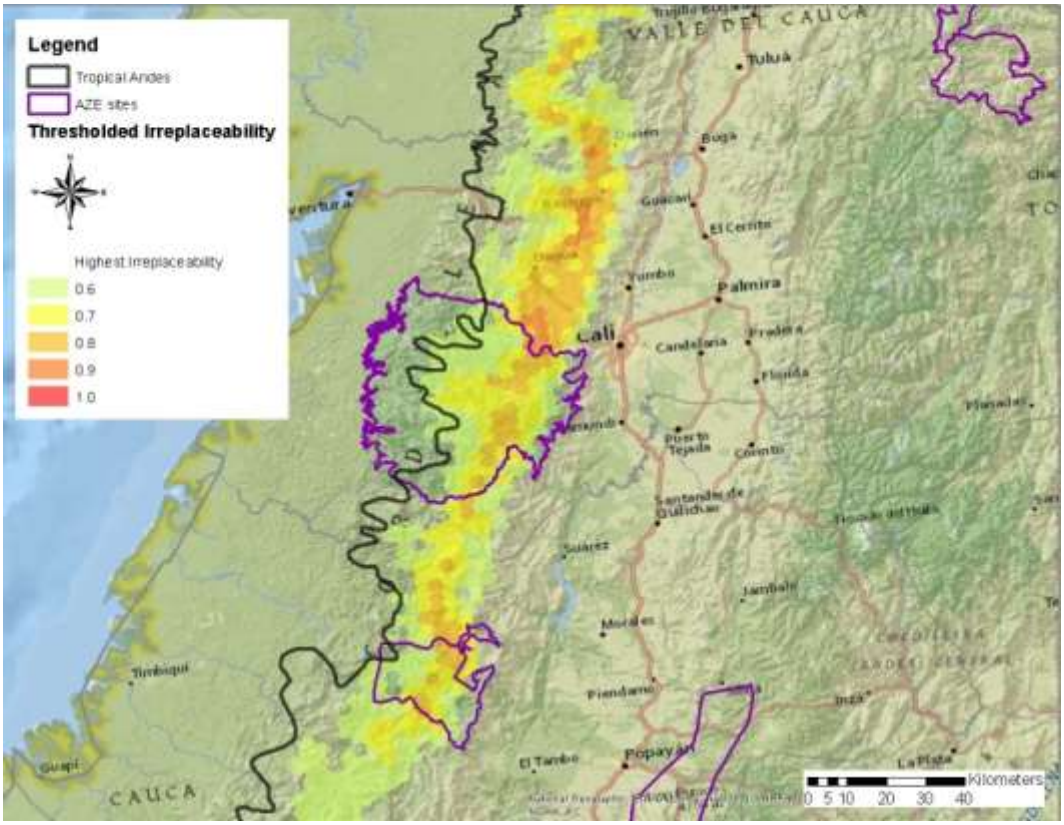
Calculation of site irreplaceability scores across the hotspot resulted in a grid with values ranging from 1 to 1,535. Figure A3.2 depicts the results for the area around Cali, Colombia.

Figure A3.2. Site Irreplaceability Index values near Cali, Colombia



Each hexagon irreplaceability score was then normalized to a scale of 0.0 to 1.0 by dividing by the highest score of any hexagon in the entire hotspot (1,535). Figure A3.3 shows the same area as the previous figures but depicts only hexagons with a normalized irreplaceability score greater than 0.5.

Figure A3.3. Thresholded Site Irreplaceability Index Scores from near Cali, Colombia



This resulting irreplaceability map of the hotspot supported the identification and mapping of new KBAs. These maps were combined with AZE and IBA locations as a base map for review by experts at stakeholder workshops. The irreplaceability maps were also used to score KBAs for their relative biodiversity value. Once KBAs were established, the species associated with each could then be derived from a database query of the hexagon maps.

KBA Boundary Definition

New KBAs were delineated to coincide with areas of high irreplaceability not already covered by an IBA or AZE site. Boundaries were drawn to match the boundaries of management units if any were nearby, or boundaries of intact habitat using land use/land cover maps (Josse *et al.* 2009). Local experts vetted these maps at national stakeholder workshops, suggesting alternative boundaries and highlighting areas with high biological value for species such as endemic páramo plants that were not included in the irreplaceability analysis for lack of range information or threat status. As described in Chapter 4, each KBA was validated with locality data (as opposed to range map data) of trigger species before being confirmed.

Site Vulnerability

Both irreplaceability and vulnerability are commonly used to gauge urgency of conservation action (Noss *et al.* 2002). To assess the impact of anthropogenic activities on the integrity of ecosystems, and to spatially represent the relative intensity and scope of those impacts across project areas, NatureServe developed the Landscape Condition Model (Comer and Faber-Langendoen 2013). This model links various land use features to their expected effect on ecological condition and the ability for species to persist.

For the Tropical Andes, the factors included in this cumulative index of current impact are transportation infrastructure, land conversion for agricultureand grazing, urban development, transmission lines, mines, pipelines, river access, and fire frequency (Table A3.3). Each factor was assigned a site intensity score reflecting the degree to which the type of land use is compatible with biodiversity. Low site intensity values indicate high incompatibility with biodiversity. Each factor was also assigned a reach distance value indicating the distance out from where the land use occurs where biodiversity is still affected. The values for each factor were derived from published data (Jarvis *et al*. 2009), except for mining concessions and road network values, which were provided by national experts.

This model provides a score for each 90-m pixel across the hotspot area from 0 to 1.0, with 0.0 representing worst condition (= highest vulnerability) and 1.0 the best condition. A map of the model results for the entire hotspot is provided in Chapter 8 (Figure 8.1). The overlay of KBAs on this landscape condition model enabled assessment of their condition and relative vulnerability. The vulnerability score was summarized for each KBA as the mean of the scores of all pixels intersecting with the KBA area. The same method was used to assess the vulnerability of corridors.

Table A3.3. Weighted Values for Direct Impacts ("Site Intensity") and Indirect Impacts ("Reach Distance") Used in the Landscape Condition Model

Factor	Year of data availability	Site intensity[1]	Reach distance (m)
Cattle/Pastures	2009	0.9	200
Agriculture	2009	0.3	200
Primary highways	2010-2012[2]	0.05	1000
Local and connecting roads	2010-2012[2]	0.5	500
Electrical transmission lines	2010	0.5	500
Unpaved roads	2010-2012[2]	0.5	200
Urban areas	2009	0.05	2000
Urban buffers	2009	0.05	1000
Gas/Oil pipelines	2010	0.5	200
River access	2010	0.9	2000
Mines	2010-2012[2]	0.05	500
Recent burns	2000-2007	0.9	200

[1]Lower value indicates higher intensity.
[2]Varies by country.

Appendix 4. Species Outcomes for the Tropical Andes Hotspot

This appendix provides a list of all threatened species and restricted range species in the Tropical Andes Hotspot that were used for the analysis presented in Chapter 4. Note that English names are not available for most species. Because digital range maps for fishes were not available, this group was not included in the analysis of KBA irreplaceability.

Scientific name[1]	English name, if available	CR	EN	VU	Restricted range	Argentina	Bolivia	Chile	Colombia	Ecuador	Peru	Venezuela
Plants												
Adelphia macrophylla					X		X					
Adelphia mirabilis					X						X	
Aiphanes pilaris					X				X			
Aiphanes verrucosa					X					X	X	
Amorimia camporum					X						X	
Aphelandra campii					X					X	X	
Aphelandra cuscoensis					X						X	
Aphelandra dasyantha					X						X	
Aphelandra eurystoma					X						X	
Aphelandra ferreyrae					X						X	
Aphelandra hapala					X						X	
Aphelandra inaequalis					X		X					
Aphelandra jacobinoides					X					X	X	
Aphelandra juninensis					X						X	
Aphelandra kolobantha					X		X					
Aphelandra latibracteata					X						X	
Aphelandra limbatifolia					X						X	
Aphelandra luyensis					X						X	
Aphelandra macrosiphon					X		X				X	
Aphelandra montis scalaris					X						X	
Aphelandra mucronata					X						X	
Aphelandra neillii					X					X	X	
Aphelandra pepe parodii					X						X	
Aphelandra peruviana					X						X	
Aphelandra rubra					X		X				X	
Aphelandra tillettii					X						X	

Scientific name[1]	English name, if available	CR	EN	VU	Restricted range	Argentina	Bolivia	Chile	Colombia	Ecuador	Peru	Venezuela
Aphelandra weberbaueri					X						X	
Aphelandra wurdackii					X						X	
Armatocereus godingianus					X					X		
Armatocereus rauhii					X					X	X	
Attalea colenda					X				X	X		
Bactris macroacantha					X					X	X	
Bejaria infundibula					X						X	
Browningia pilleifera					X						X	
brunellia acostae					X				X	X		
Brunellia boliviana				X			X				X	
Brunellia briquetii					X						X	
Brunellia brunnea					X		X				X	
brunellia cayambensis					X				X	X		
*Brunellia coroicoana**			X				X					
Brunellia cuzcoensis					X						X	
Brunellia dichapetaloides		X									X	
Brunellia dulcis			X								X	
brunellia ecuadoriensis					X					X		
Brunellia hexasepala					X						X	
brunellia macrophylla					X				X			
brunellia oliveri					X		X					
brunellia ovalifolia					X					X		
brunellia pauciflora					X					X		
Brunellia rhoides					X		X				X	
brunellia rufa					X				X			
Brunellia weberbaueri				X							X	
brunellia zamorensis					X					X		
Bunchosia berlinii					X					X	X	
Bunchosia bonplandiana					X						X	
Caiophora canarinoides					X		X				X	
Caiophora madrequisa					X						X	
Caiophora vargasii					X						X	
Calymnanthium substerile					X						X	
Cavendishia punctata					X						X	
Centropogon bangii					X		X					

Scientific name[1]	English name, if available	CR	EN	VU	Restricted range	Argentina	Bolivia	Chile	Colombia	Ecuador	Peru	Venezuela
Centropogon brittonianus					X		X					
Centropogon eilersii					X						X	
Centropogon gloriosus					X		X					
Centropogon incanus					X		X				X	
Centropogon isabellinus					X						X	
Centropogon magnificus					X		X					
Centropogon mandonis					X		X				X	
Centropogon perlongus					X						X	
Centropogon reflexus					X						X	
Centropogon umbrosus					X						X	
Centropogon unduavensis					X		X					
Centropogon varicus					X						X	
Centropogon vitifolius					X						X	
Ceratostema ferreyrae					X						X	
Ceroxylon echinulatum					X					X		
Ceroxylon parvifrons					X		X		X	X	X	
Ceroxylon parvum					X		X			X	X	
Ceroxylon quindiuense					X				X			
Ceroxylon ventricosum					X				X	X	X	
Ceroxylon weberbaueri					X						X	
Cleistocactus pungens					X						X	
Cnemidaria alatissima					X						X	
Cyathea arnecornelii					X		X					
Cyathea bettinae					X		X					
Cyathea boliviana					X		X				X	
Cyathea multisegmenta					X						X	
Demosthenesia buxifolia					X						X	
Demosthenesia cordifolia					X						X	
Demosthenesia dudleyi					X						X	
Demosthenesia mandonii					X		X				X	
Demosthenesia					X						X	

Scientific name[1]	English name, if available	CR	EN	VU	Restricted range	Argentina	Bolivia	Chile	Colombia	Ecuador	Peru	Venezuela
oppositifolia												
Demosthenesia pearcei					X		X					
Demosthenesia spectabilis					X		X				X	
Demosthenesia vilcabambensis					X						X	
Demosthenesia weberbauerii					X						X	
Dicliptera palmariensis					X		X					
Dicliptera purpurascens					X		X				X	
Diogenesia boliviana					X		X				X	
Diogenesia laxa					X						X	
Diogenesia racemosa					X		X					
Diogenesia vargasiana					X						X	
Diplopterys schunkei					X						X	
Diplopterys woytkowskii					X						X	
Disterigma ovatum					X		X				X	
Disterigma pallidum					X		X					
Disterigma pernettyoides					X		X				X	
Elaeis oleifera					X					X		
Espostoa guentheri					X		X					
Euterpe luminosa					X						X	
Fuchsia abrupta					X					X	X	
Fuchsia austromontana					X		X				X	
Fuchsia ceracea					X						X	
Fuchsia chloroloba					X		X				X	
Fuchsia cochabambana					X		X					
Fuchsia confertifolia					X						X	
Fuchsia coriacifolia					X						X	
Fuchsia decussata					X						X	
Fuchsia ferreyrae					X						X	
Fuchsia fontinalis					X						X	
Fuchsia furfuracea					X		X				X	
Fuchsia garleppiana					X		X					
Fuchsia huanucoensis					X						X	
Fuchsia inflata					X						X	

Scientific name[1]	English name, if available	CR	EN	VU	Restricted range	Argentina	Bolivia	Chile	Colombia	Ecuador	Peru	Venezuela
Fuchsia juntasensis					X		X				X	
Fuchsia llewelynii					X						X	
Fuchsia macropetala					X						X	
Fuchsia mathewsii					X						X	
Fuchsia mezae					X						X	
Fuchsia nana					X		X					
Fuchsia ovalis					X						X	
Fuchsia pilosa					X						X	
Fuchsia rivularis					X						X	
Fuchsia salicifolia					X		X				X	
Fuchsia sanmartina					X						X	
Fuchsia simplicicaulis					X						X	
Fuchsia tincta					X						X	
Fuchsia tunariensis					X		X				X	
Fuchsia vargasiana					X						X	
Fuchsia wurdackii					X						X	
Heteropterys andina					X					X	X	
Heteropterys oxenderi					X		X					
Hiraea christianeae					X						X	
Hirtella aramangensis					X						X	
Hirtella beckii					X		X					
Hirtella lightioides					X		X					
Hirtella standleyi					X						X	
Ilex crassifolioides					X						X	
Ilex gotardensis					X						X	
Ilex herzogii					X		X					
Ilex imbricata					X		X				X	
Ilex loretoica					X						X	
Ilex mandonii					X		X				X	
Ilex microsticta					X		X				X	
Ilex pseudoebenacea					X		X					
Ilex trichoclada					X		X					
Inga amboroensis					X		X					
Inga approximata					X		X				X	
Inga augustii					X						X	
Inga cynometrifolia					X						X	
Inga expansa					X		X				X	
Inga killipiana					X						X	

Scientific name[1]	English name, if available	CR	EN	VU	Restricted range	Argentina	Bolivia	Chile	Colombia	Ecuador	Peru	Venezuela
Inga pluricarpellata					X						X	
Inga tarapotensis					X						X	
Justicia albadenia					X		X				X	
Justicia alpina					X						X	
Justicia arcuata					X		X					
Justicia beckii					X		X				X	
Justicia boliviensis					X		X				X	
Justicia chapareensis					X		X					
Justicia cuspidulata					X						X	
Justicia dryadum					X		X				X	
Justicia hylophila					X					X	X	
Justicia kessleri					X		X				X	
Justicia lancifolia					X						X	
Justicia longiacuminata					X		X					
Justicia loretensis					X						X	
Justicia manserichensis					X					X	X	
Justicia mendax					X		X				X	
Justicia miguelii					X		X					
Justicia monopleurantha					X		X				X	
Justicia pluriformis					X		X					
Justicia pozuzoensis					X						X	
Justicia rauhii					X						X	
Justicia ruiziana					X						X	
Justicia rusbyana					X		X					
Justicia soukupii					X						X	
Justicia steinbachiorum					X		X					
Justicia tarapotensis					X						X	
Justicia tremulifolia					X						X	
Justicia umbricola					X		X					
Justicia weberbaueri					X						X	
Justicia yungensis					X		X					
Justicia yuyoeensis					X		X					
Licania boliviensis					X		X					
Licania bullata					X						X	
Licania cecidiophora					X					X	X	
Licania filomenoi					X						X	

Scientific name[1]	English name, if available	CR	EN	VU	Restricted range	Argentina	Bolivia	Chile	Colombia	Ecuador	Peru	Venezuela
Lophopterys peruviana					X						X	
Mauria boliviana					X		X					
Mauria denticulata					X						X	
Mauria killipii					X						X	
Mendoncia killipii					X						X	
Mendoncia peruviana					X						X	
Mendoncia robusta					X		X				X	
Mentzelia heterosepala					X						X	
Mimosa boliviana					X		X				X	
Mimosa cuzcoana					X						X	
Mimosa pectinatipinna					X						X	
Mimosa revoluta					X		X				X	
Mimosa rusbyana					X		X					
Mimosa woodii					X		X					
Nasa aspiazui					X						X	
Nasa callacallensis					X						X	
Nasa colanii					X						X	
Nasa driesslei					X						X	
Nasa ferruginea					X		X				X	
Nasa formosissima					X						X	
Nasa herzogii					X		X					
Nasa kuelapensis					X						X	
Nasa limata					X						X	
Nasa nubicolorum					X						X	
Nasa pascoensis					X						X	
Nasa stuebeliana					X						X	
Nasa tingomariensis					X						X	
Nasa umbraculifera					X						X	
Nasa victorii					X						X	
Neoraimondia herzogiana					X		X					
Odontonema hookerianum					X						X	
Oplonia grandiflora					X						X	
Oreocereus pseudofossulatus					X		X					
Orophochilus stipulaceus					X					X	X	
Pachystachys puberula					X						X	

Scientific name[1]	English name, if available	CR	EN	VU	Restricted range	Argentina	Bolivia	Chile	Colombia	Ecuador	Peru	Venezuela
Pachystachys rosea					X						X	
Pachystachys schunkei					X						X	
Parabaea sunkha					X		X					
Parajubaea torallyi					X		X					
*passiflora amazonica**			X								X	
Passiflora amazonica			X								X	
Passiflora ampulaceae					X					X		
Passiflora aristulata				X							X	
Passiflora buchtienii				X			X					
Passiflora callacallensis			X								X	
Passiflora carascoensis					X		X					
Passiflora carnosisepala					X					X		
Passiflora chaparensis		X					X					
Passiflora cirrhipes					X						X	
Passiflora colombiana					X				X			
Passiflora condorita					X					X	X	
Passiflora cuzcoensis		X									X	
Passiflora dalechampioides					X		X				X	
Passiflora deltoifolia					X					X		
Passiflora ferruginea					X						X	
Passiflora frutescens					X						X	
Passiflora gracilens					X						X	
Passiflora guenteri					X		X					
Passiflora hastifolia					X		X					
Passiflora heterohelix					X						X	
Passiflora hirtiflora					X					X		
Passiflora inca					X		X				X	
Passiflora insignis				X			X					
Passiflora jamesonii					X					X		
Passiflora linda					X					X		
Passiflora loxensis					X					X	X	
Passiflora luzmarina					X					X		
*Passiflora macropoda**			X				X					
Passiflora madidiana					X		X					
Passiflora mandonii					X		X					

Scientific name[1]	English name, if available	CR	EN	VU	Restricted range	Argentina	Bolivia	Chile	Colombia	Ecuador	Peru	Venezuela
Passiflora mapiriensis					X		X					
Passiflora nephrodes					X		X					
Passiflora parvifolia				X							X	
Passiflora pascoensis			X								X	
Passiflora pilosicorna					X		X					
Passiflora podlechii					X						X	
Passiflora quadriflora			X								X	
Passiflora roseorum					X					X		
Passiflora runa		X									X	
Passiflora sagastegui					X						X	
Passiflora sanchezii					X						X	
Passiflora sanctaebarbarae					X				X	X		
Passiflora solomonii					X		X					
*Passiflora tarapotina**			X								X	
Passiflora tatei					X		X				X	
Passiflora telesiphe					X					X		
Passiflora tesserula					X						X	
Passiflora uribei					X				X			
Passiflora venosa				X			X					
Passiflora venusta					X		X					
Passiflora weberbaueri			X								X	
Passiflora weigendii			X								X	
Passiflora zamorana					X					X	X	
Pfeiffera brevispina Rhipsalis riocampanensis					X					X	X	
Polyclita turbinata					X		X					
Psammisia globosa					X						X	
Pseuderanthemum weberbaueri					X						X	
Ruellia antiquorum					X		X					
Ruellia beckii					X		X					
Ruellia gracilis					X		X					
Ruellia phyllocalyx					X						X	
Sanchezia arborea					X						X	
Sanchezia aurantiaca					X						X	
Sanchezia aurea					X						X	
Sanchezia bicolor					X						X	

Scientific name[1]	English name, if available	CR	EN	VU	Restricted range	Argentina	Bolivia	Chile	Colombia	Ecuador	Peru	Venezuela
Sanchezia capitata					X						X	
Sanchezia conferta					X						X	
Sanchezia dasia					X						X	
Sanchezia decora					X						X	
Sanchezia ferreyrae					X						X	
Sanchezia filamentosa					X						X	
Sanchezia flava					X						X	
Sanchezia klugii					X						X	
Sanchezia lasia					X						X	
Sanchezia lispa					X						X	
Sanchezia loranthifolia					X						X	
Sanchezia megalia					X					X	X	
Sanchezia oxysepala					X						X	
Sanchezia punicea					X						X	
Sanchezia rhodochroa					X						X	
Sanchezia rubriflora					X						X	
Sanchezia sanmartininensis					X						X	
Sanchezia sprucei					X						X	
Sanchezia stenantha					X						X	
Sanchezia stenomacra					X						X	
Sanchezia tarapotensis					X						X	
Sanchezia villosa					X						X	
Sanchezia williamsii					X						X	
Sanchezia woytkowskii					X						X	
Sanchezia wurdackii					X						X	
Sanchezia xantha					X						X	
Sarcopera oxystilis					X		X				X	
Satyria boliviana					X		X				X	
Satyria neglecta					X		X					
Satyria polyantha					X						X	
Satyria vargasii					X						X	
Schinopsis peruviana					X						X	
Siphocampylus actinothrix					X						X	
Siphocampylus andinus					X		X				X	

Scientific name[1]	English name, if available	CR	EN	VU	Restricted range	Argentina	Bolivia	Chile	Colombia	Ecuador	Peru	Venezuela
Siphocampylus angustiflorus					X		X					
Siphocampylus arachnes					X						X	
Siphocampylus ayersiae					X		X				X	
Siphocampylus bilabiatus					X		X				X	
Siphocampylus boliviensis					X		X				X	
Siphocampylus comosus					X						X	
Siphocampylus correoides					X		X					
Siphocampylus dubius					X		X					
Siphocampylus flagelliformis					X		X				X	
Siphocampylus kuntzeanus					X		X					
Siphocampylus longior					X					X	X	
Siphocampylus membranaceus					X		X					
Siphocampylus neurotrichus					X		X					
Siphocampylus oblongifolius					X		X					
Siphocampylus plegmatocaulis					X						X	
Siphocampylus radiatus					X		X					
Siphocampylus reflexus					X		X					
Siphocampylus rosmarinifolius					X						X	
Siphocampylus sparsipilus					X		X					
Siphocampylus spruceanus					X						X	
Siphocampylus subcordatus					X		X					
Siphocampylus tunarensis					X		X					
Siphocampylus tunicatus					X		X					
Siphocampylus vatkeanus					X		X					
Siphocampylus werdermannii					X		X					
Siphonandra boliviana					X		X					
Souroubea fragilis					X		X				X	
Souroubea peruviana					X					X	X	

Scientific name[1]	English name, if available	CR	EN	VU	Restricted range	Argentina	Bolivia	Chile	Colombia	Ecuador	Peru	Venezuela
Souroubea stichadenia					X		X					
Sphyrospermum buesii					X						X	
Sphyrospermum sessiliflorum					X		X					
Stenostephanus cochabambensis					X		X					
Stenostephanus crenulatus					X		X				X	
Stenostephanus davidsonii					X		X				X	
Stenostephanus krukoffii					X		X					
Stenostephanus longistaminus					X		X				X	
Stenostephanus lyman-smithii					X		X				X	
Stenostephanus pyramidalis					X		X					
Stenostephanus spicatus					X		X					
Stenostephanus sprucei					X						X	
Stenostephanus tenellus					X		X					
Stigmaphyllon aberrans					X						X	
Stigmaphyllon coloratum					X		X					
Stigmaphyllon cuzcanum					X						X	
Stigmaphyllon peruvianum					X						X	
Stigmaphyllon tarapotense					X						X	
Stigmaphyllon yungasense					X		X					
Suessenguthia barthleniana					X		X				X	
Suessenguthia wenzelii					X		X					
Syagrus sancona					X		X		X	X	X	X
Syagrus yungasensis					X		X					
Tetramerium surcubambense					X						X	
Tetramerium zeta					X						X	
Themistoclesia peruviana					X		X				X	
Themistoclesia unduavensis					X		X				X	
Thibaudia axillaris					X		X					
Thibaudia biflora					X						X	

Scientific name[1]	English name, if available	CR	EN	VU	Restricted range	Argentina	Bolivia	Chile	Colombia	Ecuador	Peru	Venezuela
Thibaudia cardiophylla					X						X	
Thibaudia croatii					X						X	
Thibaudia densiflora					X		X					
Thibaudia dudleyi					X						X	
Thibaudia herrerae					X						X	
Thibaudia macrocalyx					X		X					
Thibaudia rauhii					X						X	
Thibaudia regularis					X						X	
Thibaudia uniflora					X						X	
Trichosanchezia chrysothrix					X						X	
Vaccinium elvirae					X						X	
Vaccinium mathewsii					X						X	
Vaccinium sphyrospermoides					X						X	
Weberbauerocereus madidiensis					X		X					
Weberbauerocereus rahuii					X						X	
Wettinia aequatorialis					X					X	X	
Wettinia longipetala					X						X	
Wettinia minima					X					X		
Fishes												
Astroblepus ubidiai	Andean Catfish	X								X		
Bryconamericus plutarcoi				X					X			
Orestias ctenolepis				X							X	
Orestias olivaceus				X							X	
Orestias pentlandii				X							X	
Orestias silustani				X							X	
Trichomycterus venulosus		X							X			
Amphibians												
Adenomera coca					X		X					
Agalychnis litodryas	Pink-sided Treefrog			X						X		
Allobates alessandroi					X						X	
Allobates algorei	Spotted nurse frog				X							X
Allobates bromelicola					X							X
Allobates fratisenescus					X					X		
Allobates humilis				X								X

Scientific name[1]	English name, if available	CR	EN	VU	Restricted range	Argentina	Bolivia	Chile	Colombia	Ecuador	Peru	Venezuela
Allobates juanii		X							X			
Allobates kingsburyi			X							X		
Allobates mandelorum			X									X
Allobates mcdiarmidi					X		X					
Allobates niputidea					X				X			
Allobates ornatus					X						X	
Allobates picachos					X				X			
Allobates pittieri					X							X
Allobates ranoides			X						X			
Ameerega andina	La Planada Poison Frog				X				X			
Ameerega bassleri	Pleasing Poison Frog				X						X	
Ameerega bilinguis	Ecuador Poison Frog				X				X	X		
Ameerega boliviana					X		X				X	
Ameerega cainarachi	Cainarachi Poison Frog			X							X	
Ameerega planipaleae	Oxapampa Poison Frog	X									X	
Ameerega pongoensis					X						X	
Ameerega rubriventris					X						X	
Ameerega silverstonei	Silverstone's Poison Frog				X						X	
Ameerega simulans					X						X	
Ameerega smaragdina	Emerald Poison Frog				X						X	
Ameerega yungicola					X		X					
Andinophryne atelopoides					X				X			
*Andinophryne colomai**		X								X		
Andinophryne olallai					X				X	X		
Anomaloglossus atopoglossus					X				X			
Aromobates alboguttatus			X									X
Aromobates capurinensis					X							X
Aromobates duranti			X									X
Aromobates haydeeae			X									X
Aromobates leopardalis		X										X
Aromobates mayorgai			X									X
Aromobates		X										X

Scientific name[1]	English name, if available	CR	EN	VU	Restricted range	Argentina	Bolivia	Chile	Colombia	Ecuador	Peru	Venezuela
meridensis												
Aromobates molinarii			X									X
Aromobates nocturnus	Skunk Frog	X										X
Aromobates orostoma			X									X
Aromobates saltuensis			X									X
Aromobates serranus			X									X
Atelopus andinus		X									X	
Atelopus angelito		X							X			
Atelopus ardila		X							X			
*Atelopus arsyecue**		X							X			
Atelopus arthuri		X								X		
Atelopus balios		X								X		
Atelopus bomolochos		X								X		
*Atelopus boulengeri**		X								X		
Atelopus carauta	Rio Carauta Stubfoot Toad	X							X			
Atelopus carbonerensis	Venezuelan Yellow Frog	X										X
*Atelopus carrikeri**		X							X			
*Atelopus chocoensis**		X							X			
Atelopus chrysocorallus		X										X
*Atelopus coynei**		X								X		
Atelopus cruciger	Rancho Grande Harlequin Frog	X										X
Atelopus dimorphus			X								X	
Atelopus ebenoides		X							X			
*Atelopus elegans**		X								X		
*Atelopus epikeisthos**		X									X	
*Atelopus erythropus**		X									X	
Atelopus eusebianus		X							X			
Atelopus eusebiodiazi		X									X	
Atelopus exiguus		X								X		
*Atelopus famelicus**		X							X			
Atelopus farci		X							X			
Atelopus galactogaster		X							X			
Atelopus gigas		X							X	X		
Atelopus guanujo		X								X		
Atelopus guitarraensis		X							X			

Scientific name[1]	English name, if available	CR	EN	VU	Restricted range	Argentina	Bolivia	Chile	Colombia	Ecuador	Peru	Venezuela
*Atelopus halihelos**		X								X		
*Atelopus laetissimus**		X							X			
*Atelopus longibrachius**			X						X			
Atelopus lozanoi		X							X			
*Atelopus lynchi**		X								X		
Atelopus mandingues		X							X			
*Atelopus mindoensis**		X								X		
Atelopus minutulus		X							X			
Atelopus mittermeieri			X						X			
Atelopus monohernandezii		X							X			
Atelopus mucubajiensis		X										X
Atelopus muisca		X							X			
*Atelopus nahumae**		X							X			
Atelopus nanay		X								X		
*Atelopus nepiozomus**		X								X		
Atelopus nicefori		X							X			
Atelopus onorei		X								X		
Atelopus orcesi		X								X		
Atelopus oxapampae			X								X	
Atelopus oxyrhynchus		X										X
*Atelopus pachydermus**		X								X	X	
Atelopus palmatus					X					X		
*Atelopus pastuso**		X							X	X		
Atelopus patazensis		X									X	
Atelopus pedimarmoratus		X							X			
Atelopus peruensis		X									X	
Atelopus petersi		X								X		
Atelopus petriruizi		X							X			
*Atelopus pictiventris**		X							X			
Atelopus pinangoi	Green And Red Venter Harlequin Toad	X										X
Atelopus planispina		X								X		
*Atelopus podocarpus**		X								X		
*Atelopus pulcher**		X								X	X	
Atelopus pyrodactylus		X									X	

Scientific name[1]	English name, if available	CR	EN	VU	Restricted range	Argentina	Bolivia	Chile	Colombia	Ecuador	Peru	Venezuela
Atelopus quimbaya		X							X			
Atelopus reticulatus		X									X	
Atelopus sanjosei					X				X			
*Atelopus seminiferus**		X									X	
Atelopus sernai		X							X			
Atelopus simulatus		X							X			
Atelopus siranus					X						X	
Atelopus sonsonensis		X							X			
Atelopus sorianoi	Scarlet Harlequin Toad	X										X
Atelopus spumarius				X						X		
Atelopus spurrelli				X					X			
Atelopus subornatus		X							X			
Atelopus tamaense	Tamá Harlequin Frog	X							X			X
Atelopus tricolor	Three-coloured Harlequin Toad			X			X				X	
*Atelopus walker**		X							X			
Atopophrynus syntomopus		X							X			
Barycholos pulcher					X					X		
Bolitoglossa adspersa					X				X			
Bolitoglossa borburata					X							X
Bolitoglossa capitana		X							X			
Bolitoglossa chica				X						X		
Bolitoglossa digitigrada					X						X	
Bolitoglossa equatoriana					X				X	X		
Bolitoglossa guaramacalensis				X								X
Bolitoglossa hiemalis					X				X			
Bolitoglossa hypacra	Paramo Frontino Salamander				X				X			
Bolitoglossa lozanoi					X				X			
Bolitoglossa medemi				X					X			
Bolitoglossa nicefori					X				X			
Bolitoglossa orestes				X								X
Bolitoglossa palmata				X						X		
Bolitoglossa pandi			X						X			
Bolitoglossa phalarosoma					X				X			
Bolitoglossa ramosi					X				X			

Scientific name[1]	English name, if available	CR	EN	VU	Restricted range	Argentina	Bolivia	Chile	Colombia	Ecuador	Peru	Venezuela
Bolitoglossa savagei					X				X			
Bolitoglossa silverstonei				X					X			
Bolitoglossa sima				X						X		
Bolitoglossa spongai			X									X
Bolitoglossa tatamae					X				X			
Bolitoglossa vallecula					X				X			
Bolitoglossa walkeri					X				X			
Bryophryne bustamantei			X								X	
*Bryophryne cophites**			X								X	
Bryophryne gymnotis					X						X	
Bryophryne hanssaueri					X						X	
Bryophryne nubilosus					X						X	
Bryophryne zonalis					X						X	
Caecilia abitaguae	Abitagua Caecilian				X					X		
Caecilia attenuata	Santa Rosa Caecilian				X					X		
Caecilia caribea	Pensilvania Caecilian				X				X			
Caecilia corpulenta	Solid Caecilian				X				X			
Caecilia crassisquama	Normandia Caecilian				X					X		
Caecilia degenerata	Garagoa Caecilian				X				X			
Caecilia dunni	Dunn's Caecilian				X					X		
Caecilia flavopunctata	Yellow-spotted Caecilian				X							X
Caecilia guntheri	Gunther's Caecilian				X				X	X		
Caecilia inca	Fundo Sinchona Caecilian				X						X	
Caecilia occidentalis	Cauca Caecilian				X				X			
Caecilia orientalis	La Bonita Caecilian				X				X	X		
Caecilia pachynema	Intac Caecilian				X				X	X		
Caecilia perdita	Andagoya Caecilian				X				X			
Caecilia subdermalis	Moscopan Caecilian				X				X			
Caecilia thompsoni	Thompson's Caecilian				X				X			
Celsiella vozmedianoi					X							X
Centrolene acanthidiocephalum					X				X			
Centrolene altitudinale					X							X

Scientific name[1]	English name, if available	CR	EN	VU	Restricted range	Argentina	Bolivia	Chile	Colombia	Ecuador	Peru	Venezuela
Centrolene antioquiense					X				X			
Centrolene audax			X						X	X		
Centrolene azulae			X								X	
Centrolene bacatum					X				X	X		
*Centrolene ballux**		X							X	X		
Centrolene buckleyi				X					X	X	X	X
Centrolene condor					X					X		
Centrolene daidaleum				X					X			
Centrolene durrellorum				X						X	X	
Centrolene fernandoi			X								X	
Centrolene geckoideum				X					X	X		
*Centrolene gemmatum**		X								X		
Centrolene guanacarum					X				X			
*Centrolene heloderma**		X							X	X		
Centrolene hesperium				X							X	
Centrolene huilense					X				X			
Centrolene hybrida					X				X			
Centrolene lemniscatum					X						X	
*Centrolene lynchi**			X						X	X		
Centrolene mariaelenae				X						X		
Centrolene medemi					X				X	X		
Centrolene muelleri					X						X	
Centrolene notostictum					X				X			
Centrolene ocellifera					X					X		
Centrolene paezorum					X				X			
Centrolene peristictum				X					X	X		
Centrolene petrophilum			X						X			
Centrolene pipilatum			X							X		
Centrolene quindianum				X					X			
Centrolene robledoi				X					X			
Centrolene sanchezi					X				X			
Centrolene scirtetes	Tandayapa Giant Glass Frog				X				X	X		
Centrolene solitaria					X				X			

Scientific name[1]	English name, if available	CR	EN	VU	Restricted range	Argentina	Bolivia	Chile	Colombia	Ecuador	Peru	Venezuela
Centrolene venezuelense					X							X
Ceratophrys testudo	Ecuadorian Horned Frog				X					X		
Chthonerpeton onorei	El Reventador Caecilian				X					X		
Cochranella balionota				X					X	X		
Cochranella croceopodes					X						X	
Cochranella euhystrix					X						X	
Cochranella euknemos					X				X			
Cochranella litoralis					X				X	X		
Cochranella megistra					X				X			
Cochranella nola					X		X					
Cochranella orejuela					X				X	X		
Cochranella phryxa					X		X					
Cochranella ramirezi					X				X			
Cochranella revocata				X								X
Cochranella savagei				X					X			
Cochranella xanthocheridia				X					X			
Colostethus agilis					X				X			
Colostethus alacris					X				X			
Colostethus brachistriatus					X				X			
Colostethus fraterdanieli					X				X			
Colostethus fugax					X					X		
Colostethus furviventris					X				X			
Colostethus inguinalis					X				X			
*Colostethus jacobuspetersi**		X								X		
Colostethus mertensi			X						X			
Colostethus poecilonotus					X						X	
Colostethus pratti					X				X			
Colostethus ramirezi					X				X			
*Colostethus ruthveni**			X						X			
Colostethus thorntoni					X				X			
Colostethus ucumari					X				X			
Colostethus yaguara					X				X			
Cruziohyla calcarifer	Splendid Treefrog				X					X		
Cryptobatrachus			X						X			

Scientific name[1]	English name, if available	CR	EN	VU	Restricted range	Argentina	Bolivia	Chile	Colombia	Ecuador	Peru	Venezuela
*boulengeri**												
Cryptobatrachus fuhrmanni				X					X			
Cryptobatrachus nicefori		X							X			
Dendropsophus aperomeus					X						X	
Dendropsophus battersbyi					X							X
Dendropsophus bogerti					X				X			
Dendropsophus carnifex					X					X		
Dendropsophus coffeus					X		X					
Dendropsophus columbianus					X				X			
Dendropsophus garagoensis					X				X			
Dendropsophus labialis					X				X			
Dendropsophus luteoocellatus					X							X
Dendropsophus meridensis			X									X
Dendropsophus padreluna					X				X			
Dendropsophus pelidna					X				X			X
Dendropsophus praestans					X				X			
Dendropsophus stingi				X					X			
Dendropsophus subocularis					X				X			
Dendropsophus tritaeniatus					X		X					
Dendropsophus virolinensis					X				X			
Dendropsophus yaracuyanus					X							X
Dermophis glandulosus					X				X			
Diasporus anthrax					X				X			
Ecnomiohyla phantasmagoria			X						X			
Edalorhina nasuta	Common Snouted Frog				X						X	
Elachistocleis skotogaster					X	X						
Eleutherodactylus johnstonei	Lesser Antillean Whistling Frog				X							X
Eleutherodactylus stictoboubonis					X						X	

Scientific name[1]	English name, if available	CR	EN	VU	Restricted range	Argentina	Bolivia	Chile	Colombia	Ecuador	Peru	Venezuela
Engystomops coloradorum	Colorado Dwarf Frog				X					X		
Engystomops randi					X					X		
Epicrionops columbianus	El Tambo Caecilian				X				X			
Epicrionops marmoratus	Marbled Caecilian				X					X		
Epicrionops parkeri	Parker's Caecilian				X				X			
Epicrionops peruvianus	Marcapata Valley Caecilian				X						X	
Epicrionops petersi	Peters' Caecilian				X					X	X	
Epipedobates anthonyi					X					X	X	
Epipedobates espinosai					X					X		
Epipedobates narinensis					X				X			
Epipedobates tricolor			X							X		
Espadarana andina	Andes Giant Glass Frog				X				X			X
Espadarana callistomma					X					X		
Excidobates captivus	Rio Santiago Poison Frog				X					X	X	
Excidobates mysteriosus	Marañón Poison Frog		X								X	
Flectonotus fitzgeraldi			X									X
Flectonotus pygmaeus					X				X			X
Gastrotheca abdita					X						X	
Gastrotheca andaquiensis					X				X	X		
Gastrotheca angustifrons				X					X			
Gastrotheca antomia				X					X			
Gastrotheca argenteovirens					X				X			
Gastrotheca atympana					X						X	
Gastrotheca aureomaculata					X				X			
Gastrotheca bufona			X						X			
Gastrotheca carinaceps					X						X	
Gastrotheca christiani			X			X						
Gastrotheca chrysosticta				X		X	X					
*Gastrotheca cornuta**			X						X	X		
Gastrotheca dendronastes				X					X	X		

Scientific name[1]	English name, if available	CR	EN	VU	Restricted range	Argentina	Bolivia	Chile	Colombia	Ecuador	Peru	Venezuela
Gastrotheca dunni					X				X			
Gastrotheca espeletia			X						X	X		
Gastrotheca excubitor				X							X	
Gastrotheca galeata					X						X	
Gastrotheca gracilis				X		X						
Gastrotheca griswoldi					X						X	
Gastrotheca guentheri				X					X	X		
Gastrotheca helenae					X				X			X
Gastrotheca lateonota					X						X	
Gastrotheca lauzuricae		X										
Gastrotheca litonedis			X							X		
Gastrotheca monticola					X					X	X	
Gastrotheca ochoai					X						X	
Gastrotheca orophylax			X						X	X		
Gastrotheca ossilaginis					X						X	
Gastrotheca ovifera			X									X
Gastrotheca pacchamama					X						X	
Gastrotheca peruana					X						X	
Gastrotheca phalarosa					X						X	
Gastrotheca piperata					X		X					
Gastrotheca plumbea				X						X		
Gastrotheca pseustes			X							X		
*Gastrotheca psychrophila**			X							X		
Gastrotheca rebeccae					X						X	
Gastrotheca riobambae			X							X		
Gastrotheca ruizi			X						X			
Gastrotheca splendens			X				X					
Gastrotheca stictopleura			X								X	
*Gastrotheca trachyceps**			X						X			
Gastrotheca walkeri					X							X
Gastrotheca weinlandii					X				X	X	X	
*Gastrotheca zeugocystis**		X									X	
Geobatrachus			X						X			

Scientific name[1]	English name, if available	CR	EN	VU	Restricted range	Argentina	Bolivia	Chile	Colombia	Ecuador	Peru	Venezuela
*walkeri**												
Hemiphractus johnsoni			X						X			
Hyalinobatrachium aureoguttatum					X				X	X		
Hyalinobatrachium duranti					X							X
Hyalinobatrachium esmeralda			X						X			
Hyalinobatrachium fragile				X								X
Hyalinobatrachium guairarepanense			X									X
Hyalinobatrachium ibama				X					X			
Hyalinobatrachium lemur					X						X	
Hyalinobatrachium orientale	Eastern Glass Frog			X								X
Hyalinobatrachium pallidum			X									X
Hyalinobatrachium pellucidum			X							X		
Hyalinobatrachium ruedai					X					X		
Hyla antoniiochoai					X						X	
Hylomantis danieli					X				X			
Hylomantis medinae					X							X
Hylomantis psilopygion					X				X	X		
Hyloscirtus alytolylax					X				X	X		
Hyloscirtus antoniiochoai					X						X	
Hyloscirtus bogotensis					X				X			
Hyloscirtus callipeza					X				X			
Hyloscirtus caucanus					X				X			
*Hyloscirtus charazani**			X				X					
Hyloscirtus chlorosteus	Parjacti Treefrog	X										
Hyloscirtus denticulentus			X						X			
Hyloscirtus jahni					X							X
Hyloscirtus larinopygion					X				X	X		
Hyloscirtus lascinius					X				X			X
Hyloscirtus lindae				X					X	X		
Hyloscirtus lynchi			X						X			
Hyloscirtus pacha					X					X		

Scientific name[1]	English name, if available	CR	EN	VU	Restricted range	Argentina	Bolivia	Chile	Colombia	Ecuador	Peru	Venezuela
Hyloscirtus pantostictus			X						X	X		
Hyloscirtus piceigularis			X						X			
Hyloscirtus platydactylus				X					X			X
Hyloscirtus psarolaimus			X						X	X		
*Hyloscirtus ptychodactylus**		X								X		
Hyloscirtus sarampiona					X				X			
*Hyloscirtus simmonsi**			X						X			
Hyloscirtus staufferorum			X							X		
Hyloscirtus tapichalaca					X					X		
Hyloscirtus torrenticola				X					X	X		
Hyloxalus abditaurantius					X				X			
Hyloxalus aeruginosus					X						X	
Hyloxalus anthracinus		X								X		
Hyloxalus argyrogaster	Imaza Rocket Frog				X						X	
Hyloxalus awa				X						X		
Hyloxalus azureiventris			X								X	
Hyloxalus betancuri					X				X			
Hyloxalus borjai					X				X			
Hyloxalus breviquartus					X				X	X		
Hyloxalus cevallosi			X							X	X	
Hyloxalus chocoensis	Choco Rocket Frog				X				X			
Hyloxalus craspedoceps					X						X	
*Hyloxalus delatorreae**		X								X		
Hyloxalus edwardsi		X							X			
Hyloxalus elachyhistus			X							X	X	
Hyloxalus eleutherodactylus					X						X	
Hyloxalus exasperatus					X					X		
Hyloxalus excisus					X				X			
Hyloxalus fallax					X					X		
Hyloxalus fascianigrus					X				X			

Scientific name[1]	English name, if available	CR	EN	VU	Restricted range	Argentina	Bolivia	Chile	Colombia	Ecuador	Peru	Venezuela
Hyloxalus fuliginosus					X					X		
Hyloxalus idiomelus					X						X	
Hyloxalus infraguttatus					X					X		
Hyloxalus insulatus					X						X	
Hyloxalus leucophaeus					X						X	
Hyloxalus littoralis					X						X	
Hyloxalus maculosus					X					X		
Hyloxalus maquipucuna					X					X		
Hyloxalus marmoreoventris					X					X		
Hyloxalus mittermeieri					X						X	
Hyloxalus mystax					X					X		
Hyloxalus parcus					X					X	X	
Hyloxalus patitae					X						X	
Hyloxalus peculiaris					X					X		
Hyloxalus peruvianus					X						X	
Hyloxalus pinguis					X				X			
Hyloxalus pulchellus				X					X	X		
Hyloxalus pulcherrimus					X						X	
Hyloxalus pumilus					X					X		
Hyloxalus ramosi					X				X			
Hyloxalus ruizi		X							X			
Hyloxalus saltuarius					X				X			
Hyloxalus sauli					X				X	X		
Hyloxalus shuar					X					X		
Hyloxalus sordidatus					X						X	
Hyloxalus spilotogaster					X						X	
Hyloxalus subpunctatus					X				X			
Hyloxalus sylvaticus	Forest Rocket Frog				X						X	
*Hyloxalus toachi**			X							X		
Hyloxalus utcubambensis					X						X	
Hyloxalus vergeli				X					X			
Hyloxalus vertebralis		X								X		
Hyloxalus whymperi					X					X		
Hypodactylus adercus					X				X			
Hypodactylus					X						X	

Scientific name[1]	English name, if available	CR	EN	VU	Restricted range	Argentina	Bolivia	Chile	Colombia	Ecuador	Peru	Venezuela
araiodactylus												
Hypodactylus babax					X				X	X		
Hypodactylus brunneus			X						X	X		
Hypodactylus dolops				X					X	X		
Hypodactylus elassodiscus			X						X	X		
Hypodactylus fallaciosus					X						X	
Hypodactylus latens			X						X			
Hypodactylus lucida		X									X	
Hypodactylus lundbergi					X						X	
Hypodactylus mantipus					X				X			
Hypodactylus peraccai					X					X		
Hypsiboas alboniger					X		X					
Hypsiboas alemani					X							X
Hypsiboas balzani					X		X				X	
Hypsiboas callipleura					X		X					
Hypsiboas melanopleura					X						X	
Hypsiboas palaestes					X						X	
Hypsiboas rubracylus					X				X	X		
Ikakogi tayrona	Magdalena Giant Glass Frog			X					X			
Leptodactylus pascoensis				X							X	
Leptodactylus peritoaktites	Coastal Ecuador Smoky Jungle Frog			X						X		
Leptodactylus rhodomerus	Red-thighed Thin-toed Frog				X				X	X		
Leptodactylus turimiquensis	Calf Frog				X							X
Lithobates bwana				X						X	X	
Lynchius flavomaculatus				X						X		
Lynchius nebulanastes					X						X	
Lynchius parkeri			X								X	
Mannophryne collaris			X									X
Mannophryne cordilleriana		X										X
Mannophryne herminae					X							X
Mannophryne leonardoi			X									X

Scientific name[1]	English name, if available	CR	EN	VU	Restricted range	Argentina	Bolivia	Chile	Colombia	Ecuador	Peru	Venezuela
Mannophryne neblina		X										X
Mannophryne oblitterata					X							X
Mannophryne riveroi			X									X
Mannophryne speeri					X							X
Mannophryne trujillensis			X									X
Mannophryne venezuelensis					X							X
Mannophryne yustizi			X									X
Melanophryne barbatula				X							X	
Melanophryne carpish			X								X	
Melanophryniscus rubriventris					X	X	X					
Melanophryniscus stelzneri					X	X						
Microcaecilia albiceps	Tiny White Caecilian				X				X	X		
Nannophryne apolobambica					X		X					
Nannophryne cophotis					X						X	
Nannophryne corynetes				X							X	
Nelsonophryne aequatorialis					X					X		
Niceforonia adenobrachia		X							X			
Niceforonia columbiana					X				X			
Niceforonia nana					X				X			
Noblella carrascoicola					X		X					
Noblella coloma					X					X		
Noblella duellmani					X						X	
Noblella heyeri					X					X	X	
Noblella lochites					X					X	X	
Noblella lynchi					X						X	
Noblella pygmaea					X						X	
Noblella ritarasquinae					X		X					
Nyctimantis rugiceps					X					X		
Nymphargus anomalus		X								X		
Nymphargus armatus				X					X			
Nymphargus buenaventura					X					X		
Nymphargus cariticommatus					X					X		

Scientific name[1]	English name, if available	CR	EN	VU	Restricted range	Argentina	Bolivia	Chile	Colombia	Ecuador	Peru	Venezuela
Nymphargus chami					X				X			
Nymphargus chancas					X						X	
Nymphargus chancas					X						X	
Nymphargus cochranae				X						X		
Nymphargus cristinae					X				X			
Nymphargus garciae				X					X			
Nymphargus grandisonae					X				X	X		
Nymphargus griffithsi				X					X	X		
Nymphargus ignotus					X				X			
Nymphargus luminosus			X						X			
Nymphargus luteopunctatus					X				X			
Nymphargus mariae			X								X	
Nymphargus megacheirus			X						X	X		
Nymphargus mixomaculatus					X						X	
Nymphargus nephelophila	Florencia Cochran Frog				X				X			
Nymphargus ocellatus					X						X	
Nymphargus oreonympha					X				X			
Nymphargus phenax					X						X	
Nymphargus pluvialis					X		X				X	
Nymphargus posadae				X					X	X		
Nymphargus prasinus				X					X			
Nymphargus puyoensis	Puyo Giant Glass Frog		X							X		
Nymphargus rosada				X					X			
Nymphargus ruizi				X					X			
Nymphargus siren				X					X	X	X	
Nymphargus spilotus					X				X			
Nymphargus truebae					X						X	
Nymphargus vicenteruedai					X				X			
Nymphargus wileyi					X					X		
Oedipina parvipes					X				X			
Oophaga lehmanni	Lehmann's Poison Frog	X							X			
Oophaga sylvatica					X				X	X		
Oreobates ayacucho					X						X	
Oreobates					X		X					

Scientific name[1]	English name, if available	CR	EN	VU	Restricted range	Argentina	Bolivia	Chile	Colombia	Ecuador	Peru	Venezuela
choristolemma												
Oreobates discoidalis					X	X	X					
Oreobates ibischi					X		X					
Oreobates lehri					X						X	
Oreobates madidi					X		X					
Oreobates pereger		X									X	
Oreobates sanctaecrucis					X		X					
Oreobates sanderi					X		X					
Oreobates saxatilis					X						X	
Oreobates simmonsi				X						X	X	
*Oreobates zongoensis**		X					X					
Oscaecilia polyzona	New Granada Caecilian				X				X			
Osornophryne antisana			X							X		
Osornophryne bufoniformis					X				X	X		
Osornophryne cofanorum					X					X		
Osornophryne guacamayo	Guacamayo Plump Toad		X						X	X		
Osornophryne percrassa	Herveo Plump Toad		X						X			
Osornophryne puruanta			X							X		
Osornophryne sumacoensis				X						X		
Osornophryne talipes	Cannatella's Plump Toad		X						X	X		
Osteocephalus alboguttatus					X					X		
Osteocephalus elkejungingerae					X						X	
Osteocephalus fuscifacies					X					X		
Osteocephalus leoniae					X						X	
Osteocephalus pearsoni					X		X				X	
Osteocephalus verruciger					X				X	X		
Parvicaecilia nicefori	Honda Caecilian				X				X			
Parvicaecilia pricei	El Centro Caecilian				X				X			
Phrynopus auriculatus					X						X	
Phrynopus barthlenae				X							X	
Phrynopus bracki			X								X	

Scientific name[1]	English name, if available	CR	EN	VU	Restricted range	Argentina	Bolivia	Chile	Colombia	Ecuador	Peru	Venezuela
Phrynopus bufoides					X						X	
*Phrynopus dagmarae**		X									X	
Phrynopus heimorum		X									X	
Phrynopus horstpauli				X							X	
Phrynopus juninensis		X									X	
*Phrynopus kauneorum**		X									X	
Phrynopus kotosh					X						X	
Phrynopus laplacai					X							
Phrynopus miroslawae					X						X	
Phrynopus montium			X								X	
Phrynopus nicoleae					X						X	
Phrynopus oblivius					X						X	
Phrynopus paucari					X						X	
Phrynopus peruanus					X						X	
Phrynopus pesantesi					X						X	
Phrynopus tautzorum		X									X	
Phrynopus tribulosus					X						X	
Phyllobates aurotaenia	Kokoe Poison Frog				X				X			
Phyllobates bicolor	Black-legged Poison Frog				X				X			
Phyllomedusa baltea			X								X	
Phyllomedusa duellmani					X						X	
Phyllomedusa ecuatoriana			X							X		
Phyllomedusa perinesos					X				X	X		
Pristimantis acatallelus					X				X			
Pristimantis acerus			X							X		
Pristimantis actinolaimus			X						X			
Pristimantis actites				X						X		
Pristimantis acutirostris			X						X			
Pristimantis adiastolus					X						X	
Pristimantis aemulatus					X				X			
Pristimantis affinis				X					X			
Pristimantis alalocophus					X				X			

Scientific name[1]	English name, if available	CR	EN	VU	Restricted range	Argentina	Bolivia	Chile	Colombia	Ecuador	Peru	Venezuela
*Pristimantis albericoi**		X							X			
Pristimantis albertus					X						X	
Pristimantis altamnis					X					X		
Pristimantis amydrotus					X						X	
Pristimantis anemerus					X						X	
*Pristimantis angustilineatus**			X						X			
Pristimantis aniptopalmatus					X						X	
Pristimantis anolirex					X				X			X
Pristimantis anotis					X							X
Pristimantis apiculatus					X				X	X		
Pristimantis appendiculatus					X				X	X		
Pristimantis aquilonaris					X					X	X	
Pristimantis ardalonychus					X						X	
Pristimantis atrabracus					X						X	
*Pristimantis atratus**			X							X		
Pristimantis aurantiguttatus					X				X			
Pristimantis avicuporum					X						X	
Pristimantis bacchus			X						X			
Pristimantis baiotis					X				X			
*Pristimantis balionotus**			X							X		
Pristimantis bambu	Bamboo Rain-Peeper				X					X		
*Pristimantis baryecuus**			X							X		
Pristimantis batrachites					X				X			
Pristimantis bearsei					X						X	
Pristimantis bellator					X					X	X	
Pristimantis bellona			X						X			
Pristimantis bernali		X							X			
Pristimantis bicolor				X					X			
Pristimantis bicumulus				X								X
Pristimantis bipunctatus					X						X	
Pristimantis boconoensis				X								X

Scientific name[1]	English name, if available	CR	EN	VU	Restricted range	Argentina	Bolivia	Chile	Colombia	Ecuador	Peru	Venezuela
Pristimantis bogotensis					X				X			
Pristimantis boulengeri					X				X			
Pristimantis brevifrons					X				X			
Pristimantis briceni				X								X
Pristimantis bromeliaceus				X						X	X	
Pristimantis buccinator					X						X	
Pristimantis buckleyi					X				X	X		
Pristimantis cabrerai			X						X			
*Pristimantis cacao**			X						X			
Pristimantis caeruleonotus					X					X		
Pristimantis cajamarcensis					X					X	X	
Pristimantis calcaratus			X						X			
*Pristimantis calcarulatus**				X					X	X		
Pristimantis caliginosus					X						X	
*Pristimantis capitonis**			X						X			
Pristimantis caprifer					X				X	X		
Pristimantis carlossanchezi					X				X			
Pristimantis carmelitae					X				X			
Pristimantis carranguerorum					X				X			
Pristimantis caryophyllaceus					X				X			
Pristimantis celator					X				X	X		
Pristimantis ceuthospilus				X							X	
Pristimantis chimu					X						X	
Pristimantis chloronotus					X				X	X		
*Pristimantis chrysops**			X						X			
Pristimantis citriogaster					X						X	
Pristimantis colodactylus				X						X	X	
*Pristimantis colomai**			X						X	X		
Pristimantis colonensis					X				X			
Pristimantis colostichos				X								X
Pristimantis condor				X						X	X	

Scientific name[1]	English name, if available	CR	EN	VU	Restricted range	Argentina	Bolivia	Chile	Colombia	Ecuador	Peru	Venezuela
Pristimantis cordovae				X							X	
Pristimantis corniger					X				X			
Pristimantis coronatus					X					X	X	
Pristimantis corrugatus					X						X	
Pristimantis cosnipatae			X								X	
Pristimantis cremnobates			X							X		
*Pristimantis crenunguis**			X							X		
Pristimantis cristinae					X				X			
Pristimantis crucifer				X						X		
Pristimantis cruciocularis					X						X	
Pristimantis cryophilius			X							X		
Pristimantis cryptomelas			X							X	X	
Pristimantis cuentasi					X				X			X
Pristimantis culatensis					X							X
Pristimantis cuneirostris					X						X	
Pristimantis curtipes					X				X	X		
*Pristimantis degener**			X						X	X		
*Pristimantis deinops**			X						X			
Pristimantis delicatus					X				X			
Pristimantis devillei			X							X		
Pristimantis diogenes				X					X			
*Pristimantis dissimulatus**			X							X		
Pristimantis dorsopictus			X						X			
Pristimantis douglasi				X					X			
Pristimantis duellmani				X					X	X		
Pristimantis duende					X				X			
Pristimantis dundeei					X		X					
Pristimantis elegans				X					X			
Pristimantis epacrus					X				X			
Pristimantis eremitus				X					X	X		
Pristimantis eriphus				X					X	X		
Pristimantis ernesti				X						X		
Pristimantis erythropleura					X				X			
Pristimantis			X							X		

Scientific name[1]	English name, if available	CR	EN	VU	Restricted range	Argentina	Bolivia	Chile	Colombia	Ecuador	Peru	Venezuela
*eugeniae**												
Pristimantis exoristus					X					X	X	
Pristimantis factiosus					X				X			
Pristimantis fallax			X						X			
Pristimantis fasciatus			X									X
Pristimantis fetosus			X						X			
Pristimantis flavobracatus					X						X	
Pristimantis floridus				X						X		
Pristimantis frater				X					X			
Pristimantis galdi					X					X	X	
Pristimantis ganonotus					X					X		
*Pristimantis gentry**			X							X		
Pristimantis ginesi			X									X
Pristimantis gladiator			X						X	X		
Pristimantis glandulosus			X							X		
Pristimantis gracilis				X					X			
Pristimantis grandiceps					X				X			
*Pristimantis hamiotae**		X								X		
Pristimantis hectus					X				X	X		
Pristimantis helvolus			X						X			
Pristimantis hernandezi			X						X			
Pristimantis huicundo					X					X		
Pristimantis hybotragus				X					X			
Pristimantis ignicolor			X							X		
Pristimantis illotus					X				X	X		
Pristimantis incanus			X							X		
Pristimantis incertus					X							X
Pristimantis incomptus				X						X	X	
Pristimantis infraguttatus					X						X	
*Pristimantis insignitus**			X						X			
Pristimantis inusitatus				X						X		
Pristimantis ixalus					X				X			
Pristimantis jabonensis					X							X
Pristimantis jaimei					X				X			

Scientific name[1]	English name, if available	CR	EN	VU	Restricted range	Argentina	Bolivia	Chile	Colombia	Ecuador	Peru	Venezuela
Pristimantis johannesdei			X						X			
Pristimantis jorgevelosai			X						X			
Pristimantis juanchoi					X				X			
Pristimantis jubatus					X				X			
Pristimantis karcharias					X						X	
Pristimantis kareliae					X							X
*Pristimantis katoptroides**			X							X		
Pristimantis kelephas				X					X			
Pristimantis kichwarum					X					X		
Pristimantis labiosus					X				X	X		
Pristimantis lancinii			X									X
Pristimantis lasalleorum					X				X			
Pristimantis lassoalcalai					X							X
Pristimantis laticlavius					X				X	X		
Pristimantis lemur			X						X			
Pristimantis lentiginosus					X				X			X
Pristimantis leoni					X				X	X		
Pristimantis leptolophus					X				X			
Pristimantis leucopus					X				X	X		
Pristimantis librarius					X					X		
Pristimantis lichenoides		X							X			
Pristimantis lindae					X						X	
Pristimantis lirellus					X						X	
Pristimantis lividus			X							X		
Pristimantis llojsintuta					X		X					
*Pristimantis loustes**			X						X	X		
Pristimantis lucasi					X						X	
Pristimantis luteolateralis					X					X		
Pristimantis lutitus					X				X			
Pristimantis lynchi					X				X			
Pristimantis maculosus			X						X			
Pristimantis mars			X						X			
Pristimantis medemi					X				X			

Scientific name[1]	English name, if available	CR	EN	VU	Restricted range	Argentina	Bolivia	Chile	Colombia	Ecuador	Peru	Venezuela
Pristimantis megalops					X				X			
Pristimantis melanogaster					X						X	
Pristimantis melanoproctus					X				X			X
Pristimantis mendax					X		X				X	
Pristimantis merostictus			X						X			
Pristimantis metabates					X						X	
Pristimantis minutulus					X						X	
Pristimantis miyatai					X				X			
Pristimantis mnionaetes			X						X			
Pristimantis modipeplus			X							X		
Pristimantis molybrignus					X				X			
Pristimantis mondolfii					X							X
Pristimantis muricatus				X						X		
Pristimantis muscosus					X					X	X	
Pristimantis myersi					X				X			
Pristimantis myops					X				X			
Pristimantis nephophilus				X						X	X	
Pristimantis nervicus					X				X			
Pristimantis nicefori					X				X			X
Pristimantis nigrogriseus				X						X		
Pristimantis nyctophylax				X						X		
Pristimantis obmutescens					X				X			
Pristimantis ocellatus					X				X	X		
*Pristimantis ocreatus**			X							X		
Pristimantis olivaceus					X		X					
Pristimantis orcesi					X					X		
Pristimantis orestes			X							X		
Pristimantis ornatissimus				X						X		
Pristimantis ornatus					X						X	
Pristimantis orpacobates				X					X			
Pristimantis ortizi					X					X		
Pristimantis padrecarlosi					X				X			

Scientific name[1]	English name, if available	CR	EN	VU	Restricted range	Argentina	Bolivia	Chile	Colombia	Ecuador	Peru	Venezuela
Pristimantis paisa					X				X			
Pristimantis palmeri					X				X			
Pristimantis paramerus			X									X
Pristimantis pardalinus					X						X	
Pristimantis parectatus			X						X			
Pristimantis parvillus					X				X	X		
Pristimantis pastazensis			X							X		
Pristimantis pataikos				X							X	
Pristimantis pecki					X					X	X	
Pristimantis pedimontanus					X							X
Pristimantis penelopus				X					X			
Pristimantis peraticus					X				X			
Pristimantis percnopterus					X					X	X	
*Pristimantis percultus**			X							X		
Pristimantis permixtus					X				X			
Pristimantis petersorum				X					X	X		
Pristimantis petrobardus					X						X	
Pristimantis phalaroinguinis					X						X	
Pristimantis phalarus				X					X			
Pristimantis philipi					X					X		
Pristimantis phoxocephalus					X					X	X	
Pristimantis phragmipleuron		X							X			
Pristimantis piceus					X				X			
Pristimantis pinguis					X						X	
Pristimantis platychilus				X					X			
Pristimantis pleurostriatus					X							X
Pristimantis polemistes				X					X			
*Pristimantis polychrus**			X						X			
Pristimantis prolatus			X							X		
Pristimantis prolixodiscus					X				X			X
*Pristimantis proserpens**			X							X	X	

Scientific name[1]	English name, if available	CR	EN	VU	Restricted range	Argentina	Bolivia	Chile	Colombia	Ecuador	Peru	Venezuela
Pristimantis pseudoacuminatus					X				X	X		
*Pristimantis pteridophilus**			X							X		
Pristimantis ptochus					X				X			
Pristimantis pugnax				X					X	X		
*Pristimantis pycnodermis**			X							X		
*Pristimantis pyrrhomerus**			X							X		
Pristimantis quantus				X					X			
Pristimantis quinquagesimus				X					X	X		
Pristimantis racemus					X				X			
Pristimantis reclusas					X				X			X
Pristimantis renjiforum			X						X			
Pristimantis repens				X					X			
Pristimantis restrepoi					X				X			
Pristimantis reticulatus					X							X
Pristimantis rhabdocnemus					X						X	
Pristimantis rhigophilus					X							X
*Pristimantis rhodoplichus**			X							X	X	
Pristimantis rhodostichus				X						X	X	
Pristimantis rivasi			X									X
Pristimantis riveroi					X							X
Pristimantis riveti					X					X		
Pristimantis rosadoi				X					X	X		
Pristimantis roseus					X				X			
Pristimantis rozei					X							X
Pristimantis rubicundus			X							X		
Pristimantis ruedai				X					X			
Pristimantis rufioculis					X						X	
Pristimantis ruidus					X					X		
*Pristimantis ruthveni**			X						X			
Pristimantis salaputium					X						X	
Pristimantis samaipatae					X		X					
Pristimantis sanctaemartae					X				X			

Scientific name[1]	English name, if available	CR	EN	VU	Restricted range	Argentina	Bolivia	Chile	Colombia	Ecuador	Peru	Venezuela
Pristimantis sanguineus					X				X			
Pristimantis satagius					X				X			
Pristimantis savagei					X				X			
Pristimantis schultei				X						X	X	
Pristimantis scitulus					X						X	
Pristimantis scoloblepharus			X						X			
*Pristimantis scolodiscus**			X						X	X		
Pristimantis scopaeus					X				X			
Pristimantis seorsus					X						X	
Pristimantis serendipitus				X						X	X	
Pristimantis signifer				X					X			
Pristimantis silverstonei					X				X			
Pristimantis simonbolivari			X							X		
Pristimantis simonsii		X									X	
Pristimantis simoteriscus			X						X			
Pristimantis simoterus					X				X			
*Pristimantis siopelus**			X						X	X		
*Pristimantis sobetes**			X							X		
Pristimantis spectabilis					X						X	
Pristimantis spilogaster			X						X			
Pristimantis spinosus					X					X	X	
Pristimantis stenodiscus					X							X
Pristimantis sternothylax					X						X	
Pristimantis stictoboubonus					X						X	
Pristimantis stictogaster					X						X	
Pristimantis suetus			X						X			
*Pristimantis sulculus**			X						X	X		
Pristimantis supernatis				X					X	X		
*Pristimantis surdus**			X							X		
Pristimantis susaguae					X				X			
Pristimantis taciturnus					X				X			
Pristimantis tamsitti					X				X			

Scientific name[1]	English name, if available	CR	EN	VU	Restricted range	Argentina	Bolivia	Chile	Colombia	Ecuador	Peru	Venezuela
Pristimantis tanyrhynchus					X						X	
Pristimantis tayrona					X				X			
Pristimantis telefericus					X							X
*Pristimantis tenebrionis**			X							X		
Pristimantis terraebolivaris					X							X
Pristimantis thectopternus					X				X			
Pristimantis thyellus					X							X
*Pristimantis thymalopsoides**			X							X		
Pristimantis thymelensis					X				X	X		
Pristimantis torrenticola		X							X			
Pristimantis trachyblepharis					X					X		
Pristimantis tribulosus		X							X			
Pristimantis truebae			X							X		
Pristimantis tubernasus					X				X			X
Pristimantis turik					X							X
Pristimantis turumiquirensis			X									X
Pristimantis uisae					X				X			
Pristimantis unistrigatus					X				X	X		
Pristimantis uranobates					X				X			
Pristimantis vanadise					X							X
Pristimantis veletis		X							X			
Pristimantis ventriguttatus				X							X	
Pristimantis verecundus				X					X	X		
Pristimantis versicolor				X						X	X	
Pristimantis vertebralis				X						X		
Pristimantis vicarius					X				X			
Pristimantis vidua			X							X		
Pristimantis viejas					X				X			
Pristimantis vilcabambae					X						X	
*Pristimantis viridicans**			X						X			
Pristimantis viridis					X				X			

Scientific name[1]	English name, if available	CR	EN	VU	Restricted range	Argentina	Bolivia	Chile	Colombia	Ecuador	Peru	Venezuela
Pristimantis wagteri					X						X	
Pristimantis walkeri					X					X		
Pristimantis wiensi					X						X	
Pristimantis xeniolum					X				X			
Pristimantis xestus					X				X			
Pristimantis xylochobates				X					X			
Pristimantis yukpa					X							X
Pristimantis yustizi					X							X
Pristimantis zoilae					X				X			
Pristimantis zophus			X						X			
Prostherapis dunni		X										X
Psychrophrynella adenopleura				X			X					
Psychrophrynella ankohuma				X			X					
Psychrophrynella bagrecitoi				X							X	
*Psychrophrynella boettgeri**			X								X	
Psychrophrynella chacaltaya				X			X					
Psychrophrynella condoriri					X		X					
*Psychrophrynella guillei**		X					X					
Psychrophrynella harveyi					X		X					
Psychrophrynella iani					X		X					
Psychrophrynella iatamasi					X		X					
Psychrophrynella illampu				X			X					
Psychrophrynella illimani		X					X					
*Psychrophrynella kallawaya**		X					X					
Psychrophrynella katantika					X		X					
Psychrophrynella kempffi				X			X					
Psychrophrynella pinguis				X			X					
Psychrophrynella quimsacruzis				X			X					
*Psychrophrynella saltator**		X					X					
Psychrophrynella usurpator			X								X	

Scientific name[1]	English name, if available	CR	EN	VU	Restricted range	Argentina	Bolivia	Chile	Colombia	Ecuador	Peru	Venezuela
Psychrophrynella wettsteini				X			X					
Ranitomeya abdita		X								X		
Ranitomeya benedicta	Blessed Poison Frog			X							X	
*Ranitomeya bombetes**	Cauca Poison Frog		X						X			
Ranitomeya daleswansoni				X					X			
Ranitomeya dorisswansonae		X							X			
Ranitomeya fantastica	Fantastic Poison Frog				X						X	
Ranitomeya imitator	Mimic Poison Frog				X						X	
Ranitomeya intermedia					X						X	
Ranitomeya lamasi	Pasco Poison Frog				X						X	
Ranitomeya opisthomelas	Andean Poison Frog			X					X			
Ranitomeya sirensis			X								X	
Ranitomeya summersi	Summers' Poison Frog		X								X	
Ranitomeya tolimensis			X						X			
Ranitomeya variabilis					X						X	
Ranitomeya viridis	Green Poison Frog			X					X			
Ranitomeya virolinensis			X						X			
*Rhaebo caeruleostictus**			X							X		
Rhaebo hypomelas					X				X	X		
Rhaebo lynchi					X				X			
Rheobates palmatus					X				X			
Rheobates pseudopalmatus					X				X			
*Rhinella amabilis**		X								X		
Rhinella amboroensis					X		X					
Rhinella arborescandens					X						X	
*Rhinella chavin**		X									X	
Rhinella festae					X					X	X	
Rhinella gallardoi			X			X						
Rhinella gnustae					X	X						
Rhinella inca					X						X	
Rhinella iserni	Rio Perene Toad				X						X	
Rhinella justinianoi				X			X					

Scientific name[1]	English name, if available	CR	EN	VU	Restricted range	Argentina	Bolivia	Chile	Colombia	Ecuador	Peru	Venezuela
Rhinella lindae					X				X			
Rhinella macrorhina			X						X			
Rhinella multiverrucosa					X						X	
Rhinella nesiotes			X								X	
Rhinella nicefori			X						X			
Rhinella quechua				X			X					
Rhinella rostrata		X							X			
Rhinella ruizi					X				X			
Rhinella rumbolli				X		X						
Rhinella stanlaii					X		X				X	
Rhinella sternosignata					X				X			X
Rhinella tacana					X		X					
Rhinella tenrec					X				X			
Rhinella vellardi	Alto Marañon Toad				X						X	
Rhinella yanachaga				X							X	
Rulyrana adiazeta				X					X			
Rulyrana erminea					X						X	
Rulyrana mcdiarmidi					X					X	X	
Rulyrana saxiscandens			X								X	
Rulyrana spiculata					X						X	
Rulyrana susatamai				X					X			
Rulyrana tangarana					X						X	
Sachatamia albomaculata					X				X	X		
Sachatamia punctulata				X					X			
Scinax castroviejoi					X	X	X					
Scinax flavidus					X				X			X
Scinax oreites					X						X	
Scinax squalirostris					X		X					
Scinax sugillatus					X				X	X		
Silverstoneia erasmios					X				X			
Smilisca sordida					X				X			
Strabomantis anatipes				X					X	X		
Strabomantis biporcatus				X								X
Strabomantis cadenai					X				X			
Strabomantis cerastes					X				X	X		

Scientific name[1]	English name, if available	CR	EN	VU	Restricted range	Argentina	Bolivia	Chile	Colombia	Ecuador	Peru	Venezuela
Strabomantis cheiroplethus				X					X			
Strabomantis cornutus				X					X	X		
*Strabomantis helonotus**		X								X		
Strabomantis ingeri				X					X			X
Strabomantis necerus				X						X		
Strabomantis necopinus				X					X			
*Strabomantis ruizi**			X						X			
Strabomantis zygodactylus					X				X			
Telmatobius arequipensis				X							X	
Telmatobius atacamensis		X				X						
Telmatobius atahualpai					X						X	
Telmatobius bolivianus					X		X					
Telmatobius brachydactylus			X								X	
Telmatobius brevipes			X								X	
Telmatobius brevirostris			X								X	
Telmatobius carrillae				X							X	
Telmatobius ceiorum			X			X						
Telmatobius chusmisensis					X			X				
*Telmatobius cirrhacelis**		X								X		
*Telmatobius colanensis**			X								X	
Telmatobius culeus	Titicaca Water Frog	X					X				X	
Telmatobius degener			X								X	
Telmatobius edaphonastes			X				X					
Telmatobius espadai		X					X					
Telmatobius fronteriensis					X		X	X				
Telmatobius gigas		X					X					
Telmatobius halli					X		X	X				
Telmatobius hauthali				X		X						
Telmatobius hintoni				X			X					
Telmatobius hockingi				X							X	
Telmatobius huayra				X			X					

Scientific name[1]	English name, if available	CR	EN	VU	Restricted range	Argentina	Bolivia	Chile	Colombia	Ecuador	Peru	Venezuela
Telmatobius hypselocephalus			X			X						
Telmatobius ignavus			X								X	
Telmatobius jelskii					X						X	
Telmatobius laticeps			X			X						
Telmatobius latirostris			X								X	
Telmatobius macrostomus			X								X	
Telmatobius marmoratus				X			X	X			X	
Telmatobius mayoloi			X								X	
*Telmatobius necopinus**			X								X	
Telmatobius niger		X								X		
Telmatobius oxycephalus				X		X						
Telmatobius pefauri		X						X				
Telmatobius peruvianus				X			X	X			X	
Telmatobius philippii					X			X				
Telmatobius pisanoi			X			X						
Telmatobius platycephalus			X			X						
*Telmatobius punctatus**		X									X	
Telmatobius rimac					X						X	
Telmatobius sanborni				X			X				X	
Telmatobius sibiricus			X				X					
Telmatobius simonsi					X		X					
Telmatobius stephani			X			X						
Telmatobius thompsoni			X								X	
Telmatobius timens					X		X				X	
*Telmatobius truebae**			X								X	
Telmatobius vellardi		X								X		
Telmatobius verrucosus				X			X					
Telmatobius vilamensis					X			X				
Telmatobius yuracare				X			X					
Telmatobius zapahuirensis		X						X				
Truebella skoptes					X						X	
Truebella tothastes					X						X	
Vitreorana antisthenesi				X								X

Scientific name[1]	English name, if available	CR	EN	VU	Restricted range	Argentina	Bolivia	Chile	Colombia	Ecuador	Peru	Venezuela
Vitreorana castroviejoi					X							X
Yunganastes ashkapara				X			X					
*Yunganastes bisignatus**			X				X					
Yunganastes fraudator	Cochamba Robber Frog				X		X					
Yunganastes mercedesae	Mercedes' Robber Frog				X		X				X	
Yunganastes pluvicanorus					X		X					
Reptiles												
Ameiva vittata		X					X					
Amphisbaena polygrammica	Werner's Worm Lizard				X						X	
Anadia bitaeniata	Two-banded Anadia				X							X
Anadia marmorata	Spotted Anadia			X								X
Anadia pulchella	Ruthven's Anadia			X					X			
Anolis gemmosus	O'Shaughnessy's Anole				X				X	X		
Apostolepis multicincta					X		X					
Atractus biseriatus	Two-lined Ground Snake				X				X			
Atractus crassicaudatus	Thickhead Ground Snake				X				X			
Atractus modestus	Modest Ground Snake			X						X		
Atractus nicefori	Northern Ground Snake			X					X			
Atractus obtusirostris	Bignose Ground Snake				X				X			
Atractus pauciscutatus	Little-scaled Ground Snake				X						X	
Atractus roulei	Roule's Ground Snake			X						X		
*Bothrops lojanus**	Lojan Lancehead		X							X		
Coniophanes dromiciformis	Peters' Running Snake			X						X		
Dipsas sanctijoannis	Tropical Snail-eater				X				X			
Geophis brachycephalus	Colombian Earth Snake				X				X			
Gonatodes seigliei	Estados Sucre Gecko				X							X
Lepidoblepharis colombianus					X				X			
Liolaemus capillitas	Hulse's Tree Iguana				X	X						
Liolaemus chaltin					X	X	X					

Scientific name[1]	English name, if available	CR	EN	VU	Restricted range	Argentina	Bolivia	Chile	Colombia	Ecuador	Peru	Venezuela
Liolaemus constanzae	Constanze's Tree Iguana				X	X	X	X				
Liolaemus pleopholis					X		X	X				
Liophis problematicus	Problem Ground Snake				X						X	
Liophis williamsi	Williams' Ground Snake		X									X
Liotyphlops argaleus					X				X			
Macropholidus ruthveni	Ruthven's Macropholidus				X						X	
Micrurus multiscutatus	Cauca Coral Snake				X				X			
Morunasaurus peruvianus	Cenepa Manticores				X						X	
*Pholidobolus annectens**			X							X		
Phyllodactylus interandinus	Andes Leaf-toed Gecko				X						X	
Plesiodipsas perijanensis	Alemán's Snail-eater				X				X			X
Porthidium nasutum	Hognosed Pit Viper				X				X	X		
Ptychoglossus bicolor	Werner's Largescale Lizard			X					X			
Ptychoglossus stenolepis					X				X			
Riama balneator			X							X		
Riama inanis					X							X
Riama luctuosa	Lightbulb Lizard				X							X
*Riama oculata**	Tropical Lightbulb Lizard		X							X		
Riama stigmatoral				X						X		
Sibon dunni	Dunn's Snail Sucker				X					X		
Sphaerodactylus scapularis	Boulenger's Least Gecko			X						X		
Stenocercus aculeatus					X					X	X	
Stenocercus crassicaudatus	Spiny Whorltail Iguana			X							X	
Stenocercus festae	Peracca's Whorltail Iguana			X						X		
Stenocercus frittsi					X						X	
Stenocercus haenschi	Haensch's Whorltail Iguana	X								X		
Stenocercus imitator					X						X	
Stenocercus nigromaculatus	Black-spotted Whorltail Iguana				X						X	
Stenocercus praeornatus	Greater Ornate Whorltail Iguana				X						X	
Stenocercus					X						X	

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scapularis												
Stenocercus torquatus				X							X	
Synophis lasallei	Lasalle's Fishing Snake				X				X			
Taeniophallus nebularis					X							X
Trilepida joshuai	Joshua's Blind Snake				X				X			
Trilepida nicefori	Santander Blind Snake				X				X			
Birds												
Accipiter collaris	Semicollared Hawk				X				X	X	X	
Accipiter cooperii	Cooper's Hawk				X				X			
Agamia agami	Agami Heron			X			X		X	X	X	X
Agelasticus xanthophthalmus	Pale-eyed Blackbird				X						X	
Aglaeactis aliciae	Purple-backed Sunbeam		X								X	
Aglaeactis castelnaudii	White-tufted Sunbeam				X						X	
Aglaeactis pamela	Black-hooded Sunbeam				X		X					
Aglaiocercus berlepschi	Venezuelan Sylph		X									X
Aglaiocercus coelestis	Violet-tailed Sylph				X				X	X		
Agriornis albicauda	White-tailed Shrike-tyrant			X		X	X	X		X	X	
Alectrurus tricolor	Cock-tailed Tyrant			X			X					
Amaurospiza concolor	Blue Seedeater				X				X	X		
Amazilia castaneiventris	Chestnut-bellied Hummingbird		X						X			
Amazilia viridicauda	Green-and-white Hummingbird				X						X	
Amazona barbadensis	Yellow-shouldered Amazon			X								X
Amazona tucumana	Tucuman Amazon			X		X	X					
Anairetes agraphia	Unstreaked Tit-tyrant				X						X	
*Anairetes alpinus**	Ash-breasted Tit-tyrant		X				X				X	
Anairetes nigrocristatus	Maranon Tit-tyrant				X					X	X	
Andigena cucullata	Hooded Mountain-toucan				X		X				X	
Andigena laminirostris	Plate-billed Mountain-toucan				X				X	X		
Anisognathus melanogenys	Santa Marta Mountain-tanager				X				X			
Anisognathus notabilis	Black-chinned Mountain-tanager				X				X	X		

Scientific name[1]	English name, if available	CR	EN	VU	Restricted range	Argentina	Bolivia	Chile	Colombia	Ecuador	Peru	Venezuela
Anthocephala floriceps	Blossomcrown			X					X			
Ara ambiguus	Great Green Macaw		X						X	X		
Ara militaris	Military Macaw			X		X	X		X	X	X	X
Ara rubrogenys	Red-fronted Macaw		X				X					
Aramides wolfi	Brown Wood-rail			X					X	X		
Asthenes berlepschi	Berlepsch's Canastero				X		X					
Asthenes coryi	Ochre-browed Thistletail				X							X
Asthenes griseomurina	Mouse-coloured Thistletail				X					X	X	
Asthenes harterti	Black-throated Thistletail				X		X					
Asthenes helleri	Puna Thistletail			X			X				X	
Asthenes maculicauda	Scribble-tailed Canastero				X		X				X	
Asthenes ottonis	Rusty-fronted Canastero				X						X	
Asthenes palpebralis	Eye-ringed Thistletail				X						X	
Asthenes perijana	Perija Thistletail		X						X			X
Asthenes urubambensis	Line-fronted Canastero				X		X				X	
Asthenes vilcabambae	Vilcabamba Thistletail				X						X	
Asthenes virgata	Junin Canastero				X						X	
Atlapetes albiceps	White-headed Brush-finch				X					X	X	
Atlapetes blancae	Antioquia Brush-finch	X							X			
Atlapetes canigenis	Grey Brush-finch				X						X	
Atlapetes citrinellus	Yellow-striped Brush-finch				X	X						
Atlapetes flaviceps	Yellow-headed Brush-finch		X						X			
Atlapetes forbesi	Apurimac Brush-finch				X						X	
Atlapetes fuscoolivaceus	Dusky-headed Brush-finch				X				X			
Atlapetes leucopis	White-rimmed Brush-finch				X				X	X		
Atlapetes melanocephalus	Santa Marta Brush-finch				X				X			
Atlapetes melanolaemus	Black-faced Brush-finch				X		X				X	
Atlapetes melanopsis	Black-spectacled Brush-finch		X								X	
Atlapetes nationi	Rusty-bellied Brush-finch				X						X	

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Atlapetes pallidiceps	Pale-headed Brush-finch		X							X		
Atlapetes rufigenis	Rufous-eared Brush-finch				X						X	
Atlapetes rufinucha	Bolivian Brush-finch				X		X					
Atlapetes seebohmi	Bay-crowned Brush-finch				X					X	X	
Atlapetes terborghi	Vilcabamba Brush-finch				X						X	
Attila torridus	Ochraceous Attila			X					X	X	X	
Aulacorhynchus huallagae	Yellow-browed Toucanet		X								X	
Automolus rufipectus	Santa Marta Foliage-gleaner				X				X			
*Bangsia aureocincta**	Gold-ringed Tanager		X						X			
Bangsia edwardsi	Moss-backed Tanager				X				X	X		
Bangsia melanochlamys	Black-and-gold Tanager			X					X			
Bangsia rothschildi	Golden-chested Tanager				X				X	X		
Basileuterus basilicus	Santa Marta Warbler			X					X			
Basileuterus cinereicollis	Grey-throated Warbler				X				X			X
Basileuterus conspicillatus	White-lored Warbler				X				X			
Basileuterus griseiceps	Grey-headed Warbler		X									X
Basileuterus trifasciatus	Three-banded Warbler				X					X	X	
Boissonneaua jardini	Velvet-purple Coronet				X				X	X		
Bolborhynchus ferrugineifrons	Rufous-fronted Parakeet			X					X			
Brotogeris pyrrhoptera	Grey-cheeked Parakeet		X							X	X	
*Buthraupis aureodorsalis**	Golden-backed Mountain-tanager		X								X	
Buthraupis wetmorei	Masked Mountain-tanager			X					X	X	X	
Cacicus koepckeae	Selva Cacique		X								X	
Calliphlox mitchellii	Purple-throated Woodstar				X				X	X		
Campylopterus ensipennis	White-tailed Sabrewing				X							X
*Campylopterus phainopeplus**	Santa Marta Sabrewing		X						X			
Campylopterus villaviscensio	Napo Sabrewing				X				X	X		
Capito hypoleucus	White-mantled Barbet			X					X			

Scientific name[1]	English name, if available	CR	EN	VU	Restricted range	Argentina	Bolivia	Chile	Colombia	Ecuador	Peru	Venezuela
Capito quinticolor	Five-coloured Barbet			X					X	X		
Capito wallacei	Scarlet-banded Barbet			X							X	
Caprimulgus anthonyi	Scrub Nightjar				X					X	X	
Carduelis cucullata	Red Siskin		X						X			X
Carduelis siemiradzkii	Saffron Siskin			X						X	X	
Cephalopterus penduliger	Long-wattled Umbrellabird			X					X	X		
Cercomacra parkeri	Parker's Antbird				X				X			
Chaetocercus astreans	Santa Marta Woodstar				X				X			
Chaetocercus bombus	Little Woodstar			X					X	X	X	
Chaetura vauxi	Vaux's Swift				X							X
Chalcostigma heteropogon	Bronze-tailed Thornbill				X				X			X
Chamaeza turdina	Schwartz's Antthrush				X				X			X
Charitospiza eucosma	Coal-crested Finch				X	X						
Chlorochrysa calliparaea	Orange-eared Tanager				X				X		X	X
Chlorochrysa nitidissima	Multicoloured Tanager			X					X			
Chlorochrysa phoenicotis	Glistening-green Tanager				X				X	X		
Chlorophonia flavirostris	Yellow-collared Chlorophonia				X				X	X		
Chlorospingus flavovirens	Yellow-green Bush-tanager			X					X	X		
Chlorospingus semifuscus	Dusky Bush-tanager				X				X	X		
Chlorostilbon russatus	Coppery Emerald				X				X			X
Chlorostilbon stenurus	Narrow-tailed Emerald				X				X			X
Chlorothraupis stolzmanni	Ochre-breasted Tanager				X				X	X		
*Cinclodes aricomae**	Royal Cinclodes	X					X				X	
Cinclodes excelsior	Stout-billed Cinclodes				X				X	X		
Cinclodes palliatus	White-bellied Cinclodes	X									X	
Cinclus schulzi	Rufous-throated Dipper			X		X	X					
Cinnycerthia peruana	Peruvian Wren				X						X	
Cistothorus apolinari	Apolinar's Wren		X						X			
Cistothorus meridae	Merida Wren				X							X
Clytoctantes alixii	Recurve-billed Bushbird		X						X			X
Cnipodectes	Rufous Twistwing			X							X	

Scientific name[1]	English name, if available	CR	EN	VU	Restricted range	Argentina	Bolivia	Chile	Colombia	Ecuador	Peru	Venezuela
superrufus												
Coeligena bonapartei	Golden-bellied Starfrontlet				X				X			X
Coeligena helianthea	Blue-throated Starfrontlet				X				X			X
*Coeligena orina**	Dusky Starfrontlet	X							X			
Coeligena phalerata	White-tailed Starfrontlet				X				X			
Coeligena prunellei	Black Inca			X					X			
Coeligena wilsoni	Brown Inca				X				X	X		
Compsospiza baeri	Tucuman Mountain-finch			X		X	X					
Compsospiza garleppi	Cochabamba Mountain-finch		X				X					
Conirostrum rufum	Rufous-browed Conebill				X				X			X
Conirostrum tamarugense	Tamarugo Conebill			X				X			X	
Conopias cinchoneti	Lemon-browed Flycatcher			X					X	X	X	X
Corapipo altera	White-ruffed Manakin				X				X			
Coryphaspiza melanotis	Black-masked Finch			X			X				X	
Cranioleuca albicapilla	Creamy-crested Spinetail				X						X	
Cranioleuca albiceps	Light-crowned Spinetail				X		X				X	
Cranioleuca antisiensis	Line-cheeked Spinetail				X					X	X	
Cranioleuca curtata	Ash-browed Spinetail			X			X		X	X	X	
Cranioleuca hellmayri	Streak-capped Spinetail				X				X			
*Cranioleuca henricae**	Bolivian Spinetail		X				X					
Cranioleuca marcapatae	Marcapata Spinetail			X							X	
Crax alberti	Blue-billed Curassow	X							X			
Crax alector	Black Curassow			X					X			
*Crax globulosa**	Wattled Curassow		X				X					
Crax rubra	Great Curassow			X					X	X		
Creurgops dentatus	Slaty Tanager				X		X				X	
Crypturellus transfasciatus	Pale-browed Tinamou				X					X	X	
Culicivora caudacuta	Sharp-tailed Tyrant			X			X					
Cyanolyca pulchra	Beautiful Jay				X				X	X		
Cypseloides lemosi	White-chested Swift				X				X	X		
Dacnis berlepschi	Scarlet-breasted			X					X	X		

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	Dacnis											
Dacnis hartlaubi	Turquoise Dacnis			X					X			
Dendrocincla homochroa	Ruddy Woodcreeper				X				X			X
Dendroica cerulea	Cerulean Warbler			X			X		X	X	X	X
Dendroica coronata	Yellow-rumped Warbler				X				X			X
Diglossa gloriosa	Merida Flowerpiercer				X							X
*Diglossa gloriosissima**	Chestnut-bellied Flowerpiercer		X						X			
Diglossa indigotica	Indigo Flowerpiercer				X				X	X		
Diglossa venezuelensis	Venezuelan Flowerpiercer		X									X
Doliornis remseni	Chestnut-bellied Cotinga			X					X	X		
Doliornis sclateri	Bay-vented Cotinga			X							X	
Drymotoxeres pucherani	Greater Scythebill				X				X	X	X	
Dysithamnus leucostictus	White-streaked Antvireo			X					X	X	X	X
Dysithamnus occidentalis	Bicoloured Antvireo			X					X	X	X	
Entomodestes coracinus	Black Solitaire				X				X	X		
Eriocnemis derbyi	Black-thighed Puffleg				X				X	X		
*Eriocnemis godini**	Turquoise-throated Puffleg	X								X		
*Eriocnemis isabellae**	Gorgeted Puffleg	X							X			
*Eriocnemis mirabilis**	Colourful Puffleg	X							X			
Eriocnemis mosquera	Golden-breasted Puffleg				X				X	X		
*Eriocnemis nigrivestis**	Black-breasted Puffleg	X								X		
Eulidia yarrellii	Chilean Woodstar		X					X			X	
Euphonia concinna	Velvet-fronted Euphonia				X				X			
Forpus xanthops	Yellow-faced Parrotlet			X							X	
Galbula pastazae	Coppery-chested Jacamar			X					X	X	X	
Geositta crassirostris	Thick-billed Miner				X						X	
Geositta saxicolina	Dark-winged Miner				X						X	
Geothlypis trichas	Common Yellowthroat				X				X			X
Geotrygon saphirina	Sapphire Quail-dove			X					X	X	X	
Glaucidium nubicola	Cloud-forest			X					X	X		

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	Pygmy-owl											
Glaucidium parkeri	Subtropical Pygmy-owl				X					X	X	
Grallaria albigula	White-throated Antpitta				X	X	X				X	
Grallaria alleni	Moustached Antpitta			X					X	X		
Grallaria bangsi	Santa Marta Antpitta			X					X			
Grallaria blakei	Chestnut Antpitta				X						X	
Grallaria capitalis	Bay Antpitta				X						X	
Grallaria carrikeri	Pale-billed Antpitta				X						X	
Grallaria chthonia	Tachira Antpitta	X										X
Grallaria erythroleuca	Red-and-white Antpitta				X						X	
Grallaria erythrotis	Rufous-faced Antpitta				X		X				X	
Grallaria excelsa	Great Antpitta			X					X			X
Grallaria fenwickorum	Antioquia Antpitta	X							X			
Grallaria flavotincta	Yellow-breasted Antpitta				X				X	X		
Grallaria gigantea	Giant Antpitta			X					X	X		
Grallaria griseonucha	Grey-naped Antpitta				X							X
Grallaria haplonota	Plain-backed Antpitta				X				X	X	X	X
Grallaria kaestneri	Cundinamarca Antpitta		X						X			
Grallaria milleri	Brown-banded Antpitta			X					X			
Grallaria nuchalis	Chestnut-naped Antpitta				X				X	X	X	
Grallaria przewalskii	Rusty-tinged Antpitta			X							X	
*Grallaria ridgelyi**	Jocotoco Antpitta		X							X	X	
Grallaria rufocinerea	Bicoloured Antpitta			X					X	X		
Grallaria watkinsi	Watkins's Antpitta				X					X	X	
Grallaricula cucullata	Hooded Antpitta			X					X			X
Grallaricula cumanensis	Sucre Antpitta			X								X
Grallaricula lineifrons	Crescent-faced Antpitta				X				X	X		
Grallaricula loricata	Scallop-breasted Antpitta				X							X
*Grallaricula ochraceifrons**	Ochre-fronted Antpitta		X								X	
Grallaricula peruviana	Peruvian Antpitta				X					X	X	
Gubernatrix cristata	Yellow Cardinal		X			X						

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Habia cristata	Crested Ant-tanager				X				X			
Hapalopsittaca amazonina	Rusty-faced Parrot			X					X			X
Hapalopsittaca fuertesi	Indigo-winged Parrot	X							X			
Hapalopsittaca melanotis	Black-winged Parrot				X		X				X	
Hapalopsittaca pyrrhops	Red-faced Parrot			X						X	X	
Hapaloptila castanea	White-faced Nunbird				X				X	X	X	
Haplophaedia lugens	Hoary Puffleg				X				X	X		
Harpyhaliaetus coronatus	Crowned Eagle		X			X	X					
Heliangelus mavors	Orange-throated Sunangel				X							X
Heliangelus micraster	Little Sunangel				X					X	X	
*Heliangelus regalis**	Royal Sunangel		X							X	X	
Heliangelus strophianus	Gorgeted Sunangel				X				X	X		
Heliodoxa gularis	Pink-throated Brilliant			X					X	X	X	
Heliodoxa imperatrix	Empress Brilliant				X				X	X		
hemispingus auricularis					X					X	X	
Hemispingus calophrys	Orange-browed Hemispingus				X		X				X	
Hemispingus goeringi	Slaty-backed Hemispingus			X								X
Hemispingus parodii	Parodi's Hemispingus				X						X	
Hemispingus reyi	Grey-capped Hemispingus				X							X
Hemispingus rufosuperciliaris	Rufous-browed Hemispingus			X							X	
Hemispingus trifasciatus	Three-striped Hemispingus				X		X				X	
Hemispingus verticalis	Black-headed Hemispingus				X				X	X	X	
Hemitriccus cinnamomeipectus	Cinnamon-breasted Tody-tyrant			X						X	X	
Hemitriccus spodiops	Yungas Tody-tyrant				X		X				X	
Henicorhina leucoptera	Bar-winged Wood-wren				X					X	X	
*Henicorhina negreti**	Munchique Wood-wren	X							X			
Herpsilochmus axillaris	Yellow-breasted Antwren			X					X	X	X	
Herpsilochmus motacilloides	Creamy-bellied Antwren				X						X	

Scientific name[1]	English name, if available	CR	EN	VU	Restricted range	Argentina	Bolivia	Chile	Colombia	Ecuador	Peru	Venezuela
*Herpsilochmus parkeri**	Ash-throated Antwren		X								X	
Hylocharis grayi	Blue-headed Sapphire				X				X	X		
Hylocryptus erythrocephalus	Henna-hooded Foliage-gleaner			X						X	X	
Hylonympha macrocerca	Scissor-tailed Hummingbird		X									X
Hylophilus semibrunneus	Rufous-naped Greenlet				X				X	X		X
Hypopyrrhus pyrohypogaster	Red-bellied Grackle			X					X			
Incaspiza laeta	Buff-bridled Inca-finch				X						X	
Incaspiza ortizi	Grey-winged Inca-finch			X							X	
Incaspiza personata	Rufous-backed Inca-finch				X						X	
Incaspiza pulchra	Great Inca-finch				X						X	
Incaspiza watkinsi	Little Inca-finch				X						X	
Iridosornis porphyrocephalus	Purplish-mantled Tanager				X				X	X		
Iridosornis reinhardti	Yellow-scarfed Tanager				X						X	
Laterallus levraudi	Rusty-flanked Crake		X									X
Laterallus tuerosi	Junin Rail		X								X	
Lathrotriccus griseipectus	Grey-breasted Flycatcher			X						X	X	
Leptasthenura xenothorax	White-browed Tit-spinetail		X								X	
Leptopogon taczanowskii	Inca Flycatcher				X						X	
Leptosittaca branickii	Golden-plumed Parakeet			X					X	X	X	
Leptotila conoveri	Tolima Dove		X						X			
Leptotila ochraceiventris	Ochre-bellied Dove			X						X	X	
Leptotila plumbeiceps	Grey-headed Dove				X				X			
Leucippus baeri	Tumbes Hummingbird				X					X	X	
Leucopternis occidentalis	Grey-backed Hawk		X							X	X	
Lipaugus fuscocinereus	Dusky Piha				X				X	X	X	
Lipaugus uropygialis	Scimitar-winged Piha			X			X				X	
Lipaugus weberi	Chestnut-capped Piha		X						X			
*Loddigesia mirabilis**	Marvellous Spatuletail		X								X	
Lophornis ornatus	Tufted Coquette				X							X

Scientific name[1]	English name, if available	CR	EN	VU	Restricted range	Argentina	Bolivia	Chile	Colombia	Ecuador	Peru	Venezuela
Lophornis stictolophus	Spangled Coquette				X					X	X	X
Machaeropterus deliciosus	Club-winged Manakin				X				X	X		
Macroagelaius subalaris	Mountain Grackle		X						X			X
Margarornis stellatus	Fulvous-dotted Treerunner				X				X	X		
Megascops colombianus	Colombian Screech-owl				X				X	X		
Megascops hoyi	Montane Forest Screech-owl				X	X	X					
Megascops koepckeae	Koepcke's Screech-owl				X						X	
Megascops marshalli	Cloud-forest Screech-owl				X		X				X	
Megascops petersoni	Cinnamon Screech-owl				X					X	X	
Melanopareia maranonica	Maranon Crescentchest				X					X	X	
Metallura aeneocauda	Scaled Metaltail				X		X				X	
Metallura baroni	Violet-throated Metaltail		X							X		
Metallura eupogon	Fire-throated Metaltail				X						X	
Metallura iracunda	Perija Metaltail		X						X			X
Metallura odomae	Neblina Metaltail				X					X	X	
Metallura theresiae	Coppery Metaltail				X						X	
Micrastur plumbeus	Plumbeous Forest-falcon			X					X	X		
Myiarchus apicalis	Apical Flycatcher				X				X			
Myiarchus semirufus	Rufous Flycatcher		X							X	X	
Myioborus albifrons	White-fronted Redstart				X							X
Myioborus flavivertex	Yellow-crowned Redstart				X				X			
Myioborus pariae	Paria Redstart		X									X
Myiopagis olallai	Foothill Elaenia			X						X	X	
Myiophobus inornatus	Unadorned Flycatcher				X		X				X	
Myiophobus phoenicomitra	Orange-crested Flycatcher				X				X	X	X	
Myiotheretes fuscorufus	Rufous-bellied Bush-tyrant				X		X				X	
*Myiotheretes pernix**	Santa Marta Bush-tyrant		X						X			
Myrmeciza griseiceps	Grey-headed Antbird			X						X	X	
Myrmotherula grisea	Ashy Antwren				X		X				X	
Neocrex colombiana	Colombian Crake				X				X	X		

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*Neomorphus radiolosus**	Banded Ground-cuckoo		X						X	X		
Nephelomyias lintoni	Orange-banded Flycatcher				X					X	X	
Nephelornis oneilli	Pardusco				X						X	
Nothocercus nigrocapillus	Hooded Tinamou			X			X				X	
Nothoprocta curvirostris	Curve-billed Tinamou				X					X	X	
Nothoprocta taczanowskii	Taczanowski's Tinamou			X							X	
Nyctibius maculosus	Andean Potoo				X					X		
Ochthoeca piurae	Piura Chat-tyrant				X						X	
Odontophorus atrifrons	Black-fronted Wood-quail			X					X			X
Odontophorus balliviani	Stripe-faced Wood-quail				X		X				X	
Odontophorus columbianus	Venezuelan Wood-quail				X							X
Odontophorus melanonotus	Dark-backed Wood-quail			X					X	X		
Odontophorus strophium	Gorgeted Wood-quail		X						X			
*Ognorhynchus icterotis**	Yellow-eared Parrot		X						X	X		X
Onychorhynchus occidentalis	Pacific Royal Flycatcher			X						X	X	
Opisthoprora euryptera	Mountain Avocetbill				X				X	X		
Oreonympha nobilis	Bearded Mountaineer				X						X	
Oreothraupis arremonops	Tanager Finch			X					X	X		
Oreotrochilus adela	Wedge-tailed Hillstar				X	X	X					
Oreotrochilus chimborazo	Ecuadorian Hillstar				X				X	X		
Ortalis erythroptera	Rufous-headed Chachalaca			X						X	X	
Oxypogon guerinii	Bearded Helmetcrest				X				X			X
Pachyramphus spodiurus	Slaty Becard		X							X	X	
Passerina caerulea	Blue Grosbeak				X				X			X
Patagioenas oenops	Peruvian Pigeon			X						X	X	
Patagioenas subvinacea	Ruddy Pigeon			X			X		X	X	X	X
Pauxi pauxi	Helmeted Curassow		X						X			X
*Pauxi unicornis**	Horned Curassow		X				X				X	
Penelope albipennis	White-winged Guan	X								X	X	

Scientific name[1]	English name, if available	CR	EN	VU	Restricted range	Argentina	Bolivia	Chile	Colombia	Ecuador	Peru	Venezuela
Penelope barbata	Bearded Guan			X						X	X	
Penelope dabbenei	Red-faced Guan				X	X	X					
*Penelope ortoni**	Baudo Guan		X						X	X		
*Penelope perspicax**	Cauca Guan		X						X			
Phacellodomus dorsalis	Chestnut-backed Thornbird			X							X	
Phaethornis koepckeae	Koepcke's Hermit				X						X	
Phaethornis stuarti	White-browed Hermit				X		X				X	
Phalaropus fulicarius	Red Phalarope				X				X			
Phalcoboenus carunculatus	Carunculated Caracara				X				X	X		
Pharomachrus fulgidus	White-tipped Quetzal				X				X			X
*Phibalura boliviana**	Palkachupa Cotinga		X				X					
Phlogophilus harterti	Peruvian Piedtail				X						X	
Phlogophilus hemileucurus	Ecuadorian Piedtail			X					X	X	X	
Phoenicoparrus andinus	Andean Flamingo			X		X	X	X			X	
phyllomyias sp					X		X				X	
Phyllomyias urichi	Urich's Tyrannulet		X									X
Phyllomyias weedeni	Yungas Tyrannulet			X			X				X	
Phylloscartes flaviventris	Rufous-lored Tyrannulet				X							X
Phylloscartes gualaquizae	Ecuadorian Tyrannulet				X					X		
Phylloscartes lanyoni	Antioquia Bristle-tyrant		X						X			
Phylloscartes parkeri	Cinnamon-faced Tyrannulet				X		X				X	
Phylloscartes superciliaris	Rufous-browed Tyrannulet				X				X			X
Phylloscartes venezuelanus	Venezuelan Bristle-tyrant				X							X
Phytotoma raimondii	Peruvian Plantcutter		X								X	
Picumnus granadensis	Greyish Piculet				X				X			
Picumnus sclateri	Ecuadorian Piculet				X					X	X	
Picumnus steindachneri	Speckle-chested Piculet			X							X	
Picumnus subtilis	Fine-barred Piculet				X						X	
Pionites leucogaster	White-bellied Parrot			X			X				X	
Pipile cumanensis	Blue-throated Piping-guan			X			X		X	X	X	
Pipreola aureopectus	Golden-breasted				X				X			X

Scientific name[1]	English name, if available	CR	EN	VU	Restricted range	Argentina	Bolivia	Chile	Colombia	Ecuador	Peru	Venezuela
	Fruiteater											
Pipreola formosa	Handsome Fruiteater				X							X
Pipreola intermedia	Band-tailed Fruiteater				X		X				X	
Pipreola jucunda	Orange-breasted Fruiteater				X				X	X		
Pipreola lubomirskii	Black-chested Fruiteater				X				X	X	X	
Pipreola pulchra	Masked Fruiteater				X						X	
Podiceps taczanowskii	Junin Grebe	X									X	
Poecilotriccus albifacies	White-cheeked Tody-flycatcher				X						X	
*Poecilotriccus luluae**	Lulu's Tody-flycatcher		X								X	
Poecilotriccus pulchellus	Black-backed Tody-flycatcher				X						X	
Poospiza alticola	Plain-tailed Warbling-finch		X								X	
Poospiza caesar	Chestnut-breasted Mountain-finch				X						X	
Poospiza rubecula	Rufous-breasted Warbling-finch		X								X	
Premnoplex tatei	White-throated Barbtail			X								X
Primolius couloni	Blue-headed Macaw			X			X				X	
Progne murphyi	Peruvian Martin			X							X	
Pseudotriccus simplex	Hazel-fronted Pygmy-tyrant				X		X				X	
Pyrrhura albipectus	White-necked Parakeet			X						X	X	
Pyrrhura calliptera	Flame-winged Parakeet			X					X			X
Pyrrhura hoematotis	Red-eared Parakeet				X							X
Pyrrhura leucotis	Maroon-faced Parakeet				X							X
Pyrrhura orcesi	El Oro Parakeet		X							X		
Pyrrhura rhodocephala	Rose-headed Parakeet				X							X
*Pyrrhura viridicata**	Santa Marta Parakeet		X						X			
Rallus semiplumbeus	Bogota Rail		X						X			
Rallus wetmorei	Plain-flanked Rail				X							X
Ramphastos ambiguus	Black-mandibled Toucan			X					X	X	X	X
Ramphocelus melanogaster	Huallaga Tanager				X						X	
*Ramphomicron dorsale**	Black-backed Thornbill		X						X			

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Rhynchospiza stolzmanni	Tumbes Sparrow				X					X	X	
Rollandia microptera	Titicaca Grebe		X				X	X			X	
Saltator nigriceps	Black-cowled Saltator				X					X	X	
Saltator rufiventris	Rufous-bellied Saltator				X	X	X					
schizoeaca harterti					X		X					
Scytalopus acutirostris	Tschudi's Tapaculo				X						X	
Scytalopus affinis	Ancash Tapaculo				X						X	
Scytalopus altirostris	Neblina Tapaculo				X						X	
Scytalopus canus	Paramillo Tapaculo		X						X			
Scytalopus caracae	Caracas Tapaculo				X							X
Scytalopus chocoensis	Choco Tapaculo				X				X	X		
Scytalopus femoralis	Rufous-vented Tapaculo				X						X	
Scytalopus griseicollis	Pale-bellied Tapaculo				X				X			
Scytalopus latebricola	Brown-rumped Tapaculo				X				X			
Scytalopus macropus	Large-footed Tapaculo				X						X	
Scytalopus meridanus	Merida Tapaculo				X							X
Scytalopus micropterus	Long-tailed Tapaculo				X				X	X	X	
Scytalopus parkeri	Chusquea Tapaculo				X					X	X	
Scytalopus robbinsi	Ecuadorian Tapaculo		X							X		
Scytalopus rodriguezi	Upper Magdalena Tapaculo		X						X			
Scytalopus sanctaemartae	Santa Marta Tapaculo				X				X			
Scytalopus schulenbergi	Diademed Tapaculo				X		X				X	
Scytalopus simonsi	Puna Tapaculo				X		X				X	
Scytalopus stilesi	Stiles's Tapaculo				X				X			
Scytalopus superciliaris	White-browed Tapaculo				X	X	X					
Scytalopus unicolor	Unicoloured Tapaculo				X						X	
Scytalopus urubambae	Vilcabamba Tapaculo				X						X	
Scytalopus vicinior	Narino Tapaculo				X				X	X		
Scytalopus zimmeri	Zimmer's Tapaculo				X		X					
Semnornis ramphastinus	Toucan Barbet				X				X	X		
Sericossypha	White-capped			X					X	X	X	X

Scientific name[1]	English name, if available	CR	EN	VU	Restricted range	Argentina	Bolivia	Chile	Colombia	Ecuador	Peru	Venezuela
albocristata	Tanager											
Simoxenops striatus	Bolivian Recurvebill				X		X				X	
Siptornis striaticollis	Spectacled Prickletail				X				X	X	X	
Siptornopsis hypochondriaca	Great Spinetail			X							X	
Snowornis subalaris	Grey-tailed Piha				X				X	X	X	
Spizaetus isidori	Black-and-chestnut Eagle			X		X	X		X	X	X	X
Sterna paradisaea	Arctic Tern				X		X					
Sternoclyta cyanopectus	Violet-chested Hummingbird				X							X
Synallaxis castanea	Black-throated Spinetail				X							X
Synallaxis courseni	Apurimac Spinetail			X							X	
Synallaxis fuscorufa	Rusty-headed Spinetail			X					X			
*Synallaxis maranonica**	Maranon Spinetail	X								X	X	
Synallaxis subpudica	Silvery-throated Spinetail				X				X			
Synallaxis tithys	Blackish-headed Spinetail		X							X	X	
Syndactyla guttulata	Guttulate Foliage-gleaner				X							X
Syndactyla ruficollis	Rufous-necked Foliage-gleaner			X						X	X	
Tachornis furcata	Pygmy Swift				X				X			X
Tachycineta bicolor	Tree Swallow				X				X			
Tangara argyrofenges	Straw-backed Tanager			X			X				X	
Tangara florida	Emerald Tanager				X				X	X		
Tangara icterocephala	Silver-throated Tanager				X				X	X		
Tangara meyerdeschauenseei	Green-capped Tanager			X			X				X	
Tangara palmeri	Grey-and-gold Tanager				X				X	X		
Tangara phillipsi	Sira Tanager				X						X	
Tangara rufigenis	Rufous-cheeked Tanager				X							X
Tangara rufigula	Rufous-throated Tanager				X				X	X		
Taphrolesbia griseiventris	Grey-bellied Comet		X								X	
*Terenura sharpei**	Yellow-rumped Antwren		X				X				X	
Thamnophilus aroyae	Upland Antshrike				X		X				X	
Thamnophilus tenuepunctatus	Lined Antshrike			X					X	X	X	

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Thamnophilus zarumae	Chapman's Antshrike				X					X	X	
Thlypopsis fulviceps	Fulvous-headed Tanager				X				X			X
Thlypopsis inornata	Buff-bellied Tanager				X					X	X	
Thlypopsis pectoralis	Brown-flanked Tanager				X						X	
Thripadectes ignobilis	Uniform Treehunter				X				X	X		
Thripadectes virgaticeps	Streak-capped Treehunter				X				X	X		X
Thripophaga berlepschi	Russet-mantled Softtail			X							X	
Thryothorus eisenmanni	Inca Wren				X						X	
Thryothorus nicefori	Niceforo's Wren	X							X			
Thryothorus spadix	Sooty-headed Wren				X				X			
Tinamus osgoodi	Black Tinamou			X					X	X	X	
Tinamus tao	Grey Tinamou			X			X		X	X	X	X
Touit huetii	Scarlet-shouldered Parrotlet			X			X		X	X	X	X
Touit stictopterus	Spot-winged Parrotlet			X					X	X	X	
*Troglodytes monticola**	Santa Marta Wren	X							X			
Turdus maranonicus	Maranon Thrush				X					X	X	
Urosticte benjamini	Purple-bibbed Whitetip				X				X	X		
Urothraupis stolzmanni	Black-backed Bush-finch				X				X	X		
*Vireo masteri**	Choco Vireo		X						X	X		
Wetmorethraupis sterrhopteron	Orange-throated Tanager			X						X	X	
Xenerpestes singularis	Equatorial Greytail				X					X	X	
*Xenoglaux loweryi**	Long-whiskered Owlet		X								X	
Xenopipo flavicapilla	Yellow-headed Manakin				X				X	X		
Zimmerius villarejoi	Mishana Tyrannulet			X							X	
Zimmerius viridiflavus	Tschudi's Tyrannulet				X						X	
Mammals												
Abrocoma boliviensis	Bolivian Chinchilla Rat	X					X					
Abrocoma budini	Budin's Chinchilla Rat				X	X						
Abrothrix illuteus	Gray Akodont				X	X						

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Aepeomys lugens	Olive Montane Mouse				X							X
Aepeomys reigi	Reig's Aepeomys			X								X
Akodon affinis	Colombian Grass Mouse				X				X			
Akodon aliquantulus	Diminutive Akodont				X	X						
Akodon budini	Budin's Grass Mouse				X	X	X					
Akodon kofordi	Koford's Grass Mouse				X		X				X	
Akodon latebricola	Ecuadorean Grass Mouse			X						X		
Akodon leucolimnaeus					X	X						
Akodon mimus	Thespian Grass Mouse				X		X				X	
Akodon orophilus	El Dorado Grass Mouse				X						X	
Akodon pervalens	Tarija Akodont				X		X					
Akodon siberiae	Cochabamba Grass Mouse				X		X					
Akodon surdus	Silent Grass Mouse			X							X	
Akodon sylvanus	Forest Grass Mouse				X	X	X					
Akodon torques	Cloud Forest Grass Mouse				X						X	
Amorphochilus schnablii	Smokey Bat		X							X	X	
Anotomys leander	Ecuadoran Ichthyomyine			X						X		
Anoura fistulata					X					X	X	
Aotus brumbacki	Brumback's Night Monkey			X					X			
Aotus griseimembra	Grey-handed Night Monkey			X					X			X
Aotus jorgehernandezi	Hernández-Camacho's Night Monkey				X				X			
Aotus lemurinus	Colombian Night Monkey			X					X	X		X
Aotus miconax	Andean Night Monkey			X							X	
Ateles belzebuth	Long-haired Spider Monkey		X						X	X	X	
Ateles chamek	Black-faced Black Spider Monkey		X				X				X	
*Ateles fusciceps**	Brown-headed Spider Monkey	X							X	X		
Ateles hybridus	Variegated Spider Monkey	X							X			X

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*Balantiopteryx infusca**	Ecuadorian Sac-winged Bat		X						X	X		
Caenolestes condorensis				X						X	X	
Caenolestes convelatus	Blackish Shrew Opossum			X					X	X		
Callicebus aureipalatii	Madidi Titi Monkey				X		X					
Callicebus modestus	Beni Titi Monkey		X				X					
*Callicebus oenanthe**	San Martin Titi Monkey	X									X	
Callicebus ornatus	Ornate Tití Monkey			X					X			
Callimico goeldii	Goeldi's Monkey			X					X	X	X	
Calomys fecundus					X	X	X					
Chaetophractus nationi	Andean Hairy Armadillo			X		X	X	X			X	
Chibchanomys orcesi	Las Cajas Ichthyomyine				X					X		
Chibchanomys trichotis	Chibchan Water Mouse				X				X		X	X
Chinchilla chinchilla	Short-tailed Chinchilla	X				X	X	X				
Choeroniscus periosus	Greater Long-tailed Bat			X					X	X		
Coendou sanctamartae					X				X			
Cryptotis brachyonyx	Eastern Cordillera Small-footed Shrew				X				X			
Cryptotis colombiana	Colombian Small-eared Shrew				X				X			
Cryptotis equatoris	Ecuadorean Small-eared Shrew				X					X		
Cryptotis medellinia	Medellín Small-eared Shrew				X				X			
Cryptotis meridensis	Merida Small-eared Shrew				X							X
Cryptotis montivaga	Ecuadorean Small-eared Shrew				X					X		
Cryptotis peruviensis	Peruvian Small-eared Shrew				X					X	X	
Cryptotis squamipes	Scaly-footed Small-eared Shrew				X				X	X		
Cryptotis tamensis	Tamá Small-eared Shrew				X				X			X
Cryptotis thomasi	Thomas' Small-eared Shrew				X				X			
Ctenomys budini					X	X						
Ctenomys coludo					X	X						
Ctenomys fochi					X	X						
Ctenomys frater	Forest Tuco-tuco				X	X	X					

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Ctenomys juris					X	X						
Ctenomys knighti	Catamarca Tuco-tuco				X	X						
Ctenomys latro	Mottled Tuco-tuco			X		X						
Ctenomys leucodon	White-toothed Tuco-tuco				X		X				X	
Ctenomys lewisi	Lewis's Tuco-tuco				X		X					
Ctenomys peruanus	Peruvian Tuco-tuco				X		X				X	
Ctenomys saltarius	Salta Tuco-tuco				X	X						
Ctenomys scagliai					X	X						
Ctenomys sylvanus					X	X						
Ctenomys tuconax	Robust Tuco-tuco				X	X						
Ctenomys tucumanus	Tucuman Tuco-tuco				X	X						
Cuscomys ashaninka	Ashaninika Arboreal Chinchilla Rat				X						X	
Dactylomys peruanus	Peruvian Bamboo Rat				X		X				X	
Dasypus pilosus	Hairy Long-nosed Armadillo			X							X	
Dasypus yepesi	Yunga's Lesser Long-Nosed Armadillo				X	X	X					
Diclidurus ingens	Greater Ghost Bat				X							X
Dinomys branickii	Pacarana			X			X		X	X	X	X
Diplomys caniceps	Arboreal Soft-furred Spiny Rat				X				X			
Eremoryzomys polius	Gray Rice Rat				X					X	X	
Galea monasteriensis					X		X					
Galenomys garleppi	Gerlepp's Mouse				X		X	X			X	
Gracilinanus dryas	Wood Sprite Gracile Mouse Opossum				X				X			X
Gracilinanus emiliae	Emilia's Gracile Mouse Opossum				X							X
Graomys edithae	Edith's Leaf-eared Mouse				X	X						
Handleyomys intectus	Colombian Rice Rat				X				X			
Heteromys teleus				X						X		
Hippocamelus antisensis	Taruca			X		X	X	X			X	
Hylaeamys tatei					X					X		
Ichthyomys pittieri	Pittier's Crab-eating Rat			X								X

Scientific name[1]	English name, if available	CR	EN	VU	Restricted range	Argentina	Bolivia	Chile	Colombia	Ecuador	Peru	Venezuela
Ichthyomys stolzmanni	Stolzmann's Crab-eating Rat				X					X	X	
Ichthyomys tweedii	Tweedy's Crab-eating Rat				X					X		
Isothrix barbarabrownae	Barbara Brown's Brush-tailed Rat				X						X	
Lagothrix cana	Geoffroy's Peruvian Woolly Monkey		X				X				X	
Lagothrix lagotricha	Common Woolly Monkey			X					X	X		
Lagothrix lugens	Colombian Woolly Monkey	X							X			
Lagothrix poeppigii	Poeppig's Woolly Monkey			X						X	X	
Lenoxus apicalis	Andean Rat				X		X				X	
Leopardus jacobita	Andean Cat		X			X	X	X			X	
Leopardus tigrinus	Oncilla			X		X	X		X	X	X	X
Leptonycteris curasoae	Curaçaoan Long-nosed Bat			X					X			X
Lestoros inca	Incan Shrew Opossum				X		X				X	
Lonchophylla chocoana					X				X	X		
Lonchophylla orcesi					X					X		
Lonchorhina orinocensis	Orinoco Sword-nosed Bat			X					X			
Lophostoma aequatorialis					X					X		
Marmosa alstoni	Alston's Woolly Mouse Opossum				X				X			
Marmosa phaeus	Little Woolly Mouse Opossum			X					X	X	X	
Marmosa quichua	Quechuan Mouse Opossum				X						X	
Marmosops creightoni					X		X				X	
Marmosops handleyi	Handley's Slender Mouse Opossum	X							X			
Marmosops juninensis				X							X	
Mazama bricenii	Mérida Brocket			X					X			X
Mazama chunyi	Peruvian Dwarf Brocket			X			X				X	
Mazama rufina	Dwarf Red Brocket			X					X	X	X	
Melanomys robustulus	Robust Dark Rice Rat				X					X	X	
Mesomys leniceps	Woolly-headed Spiny Tree Rat				X						X	
Microcavia shiptoni	Shipton's Mountain Cavy				X	X						

Scientific name[1]	English name, if available	CR	EN	VU	Restricted range	Argentina	Bolivia	Chile	Colombia	Ecuador	Peru	Venezuela
Microsciurus alfari	Central American Dwarf Squirrel				X				X			
Mimon koepckeae					X						X	
*Mindomys hammondi**	Hammond's Rice Rat		X							X		
Mormopterus phrudus	Incan Little Mastiff Bat			X							X	
Mustela felipei	Colombian Weasel			X					X	X		
Myotis nesopolus	Curacao Myotis				X				X			X
Myrmecophaga tridactyla	Giant Anteater			X		X	X		X	X	X	X
Nephelomys auriventer	Ecuadorean Rice Rat				X					X	X	
Nephelomys caracolus					X							X
Nephelomys meridensis					X							X
Neusticomys mussoi	Musso's Fish-eating Rat		X									X
Neusticomys venezuelae	Venezuelan Fish-eating Rat			X								X
Olallamys albicauda	White-tailed Olalla Rat				X				X			
Olallamys edax	Greedy Olalla Rat				X							X
Oligoryzomys brendae	Brenda's Colilargo				X	X						
*Oreonax flavicauda**	Peruvian Yellow-tailed Woolly Monkey	X								X	X	
Oreoryzomys balneator	Peruvian Rice Rat				X					X	X	
Oxymycterus akodontius	Argentine Hocicudo				X	X						
*Oxymycterus hucucha**	Quechuan Hocicudo		X				X					
Ozotoceros bezoarticus	Pampas Deer				X		X					
Phyllotis anitae					X	X						
Phyllotis caprinus	Capricorn Leaf-eared Mouse				X	X	X					
Phyllotis definitus	Definitive Leaf-eared Mouse		X								X	
Phyllotis haggardi	Haggard's Leaf-eared Mouse				X					X		
Phyllotis osgoodi	Osgood's Leaf-eared Mouse				X			X				
*Platyrrhinus chocoensis**	Choco Broad-nosed Bat		X						X	X		
Platyrrhinus ismaeli				X					X	X	X	
Platyrrhinus umbratus	Shadowy Broad-nosed Bat				X				X			X

Scientific name[1]	English name, if available	CR	EN	VU	Restricted range	Argentina	Bolivia	Chile	Colombia	Ecuador	Peru	Venezuela
Proechimys canicollis	Colombian Spiny Rat				X				X			X
Proechimys chrysaeolus	Boyaca Spiny Rat				X				X			
Proechimys decumanus	Pacific Spiny Rat			X						X	X	
Proechimys mincae	Minca Spiny Rat				X				X			
Proechimys urichi	Sucre Spiny Rat				X							X
Pudu mephistophiles	Northern Pudu			X					X	X	X	
Punomys kofordi				X							X	
Punomys lemminus	Puna Mouse			X							X	
Reithrodon auritus	Bunny Rat				X	X						
Rhagomys longilingua					X		X				X	
Rhipidomys caucensis	Cauca Climbing Mouse				X				X			
Rhipidomys ochrogaster	Yellow-bellied Climbing Mouse				X						X	
Rhipidomys venustus	Charming Climbing Mouse				X							X
Rhogeessa minutilla	Tiny Yellow Bat			X					X			X
Saccopteryx antioquensis	Antioquian Sac-winged Bat				X				X			
Saguinus leucopus	Silvery-brown Tamarin		X						X			
Saguinus oedipus	Cotton-headed Tamarin	X							X			
*Santamartamys rufodorsalis**	Red Crested Tree Rat	X							X			
Sigmodon inopinatus	Unexpected Cotton Rat			X						X		
Sigmodontomys aphrastus	Harris's Rice Water Rat				X					X		
Sphiggurus ichillus					X					X		
Sphiggurus vestitus	Brown Hairy Dwarf Porcupine				X				X			
Sturnira mistratensis					X				X			
Sturnira nana	Lesser Yellow-shouldered Bat		X								X	
Sturnira sorianoi					X		X					X
Tapecomys primus					X	X	X					
Tapirus bairdii	Baird's Tapir		X						X			
*Tapirus pinchaque**	Mountain Tapir		X						X	X	X	
Tapirus terrestris	Lowland Tapir			X		X	X		X	X	X	X
Tayassu pecari	White-lipped Peccary			X		X	X		X	X	X	X

Scientific name[1]	English name, if available	CR	EN	VU	Restricted range	Argentina	Bolivia	Chile	Colombia	Ecuador	Peru	Venezuela
Thomasomys apeco				X							X	
Thomasomys bombycinus	Silky Oldfield Mouse				X				X			
Thomasomys caudivarius					X					X	X	
Thomasomys cinereus	Ash-colored Oldfield Mouse				X						X	
Thomasomys cinnameus					X				X	X		
Thomasomys daphne	Daphne's Oldfield Mouse				X		X				X	
Thomasomys eleusis	Peruvian Oldfield Mouse				X						X	
Thomasomys erro					X					X		
Thomasomys gracilis	Slender Oldfield Mouse				X						X	
Thomasomys hudsoni					X					X		
Thomasomys hylophilus	Woodland Oldfield Mouse		X						X			X
Thomasomys incanus	Inca Oldfield Mouse			X							X	
Thomasomys ischyrus	Strong-tailed Oldfield Mouse			X						X	X	
Thomasomys kalinowskii	Kalinowski's Oldfield Mouse			X							X	
Thomasomys ladewi	Ladew's Oldfield Mouse				X		X				X	
Thomasomys macrotis				X							X	
*Thomasomys monochromes**	Unicolored Oldfield Mouse		X						X			
Thomasomys niveipes	Snow-footed Oldfield Mouse				X				X			
Thomasomys notatus	Distinguished Oldfield Mouse				X		X				X	
Thomasomys onkiro				X							X	
Thomasomys paramorum	Paramo Oldfield Mouse				X				X	X		
Thomasomys popayanus					X				X			
Thomasomys praetor					X						X	
Thomasomys pyrrhonotus	Thomas's Oldfield Mouse			X						X	X	
Thomasomys rhoadsi	Rhoads's Oldfield Mouse				X					X		
Thomasomys rosalinda	Rosalinda's Oldfield Mouse				X						X	
Thomasomys	Forest Oldfield				X					X		

Scientific name[1]	English name, if available	CR	EN	VU	Restricted range	Argentina	Bolivia	Chile	Colombia	Ecuador	Peru	Venezuela
silvestris	Mouse											
Thomasomys taczanowskii	Taczanowski's Oldfield Mouse				X						X	
Thomasomys ucucha				X						X		
Thomasomys vestitus	Dressy Oldfield Mouse				X							X
Thomasomys vulcani					X					X		
Thylamys cinderella	Cinderella Fat-tailed Mouse Opossum				X	X						
Tomopeas ravus	Blunt-eared Bat			X							X	
Tremarctos ornatus	Spectacled Bear			X			X		X	X	X	X
Vampyressa melissa	Melissa's Yellow-eared Bat			X					X	X	X	X

[1] Priority species for CEPF investment marked with an asterisk (*).

Appendix 5a. Characteristics of the KBAs of the Tropical Andes Hotspot

Notes: Mean vulnerability on a 0-1 scale (1 = high); Mean freshwater score, N.D. = no data.

CEPF code	KBA	Country	Protection status	Area (ha)	Mean vulnerability	Relative biodiversity value	Total carbon stored (tonnes)	Mean fresh-water score
ARG1	Abra Grande	Argentina	Partial	32,429	0.55	0.10	1,070,381	N.D.
ARG2	Acambuco	Argentina	Partial	23,475	0.21	0.10	3,097,149	N.D.
ARG3	Alto Calilegua	Argentina	Protected	774	0.19	0.18	28,986	N.D.
ARG4	Caspala y Santa Ana	Argentina	Protected	14,612	0.10	0.05	156,070	N.D.
ARG5	Cerro Negro de San Antonio	Argentina	Not protected	9,935	0.12	0.07	406,904	N.D.
ARG6	Cuesta de las Higuerillas	Argentina	Not protected	7,158	0.52	0.06	107,849	N.D.
ARG7	Cuesta del Clavillo	Argentina	Not protected	9,145	0.21	0.10	935,257	N.D.
ARG8	Cuesta del Obispo	Argentina	Not protected	25,435	0.26	0.07	1,280,299	N.D.
ARG9	Cuesta del Totoral	Argentina	Not protected	7,734	0.40	0.05	154,194	N.D.
ARG10	El Fuerte y Santa Clara	Argentina	Not protected	17,891	0.17	0.08	1,548,737	N.D.
ARG11	El Infiernillo	Argentina	Partial	708	0.59	0.13	6,018	N.D.
ARG12	Fincas Santiago y San Andrés	Argentina	Protected	32,943	0.05	0.11	4,417,953	N.D.
ARG13	Itiyuro-Tuyunti	Argentina	Partial	20,948	0.03	0.09	2,183,292	N.D.
ARG14	La Cornisa	Argentina	Not protected	19,445	0.63	0.06	1,208,112	N.D.
ARG15	La Porcelana	Argentina	Not protected	13,276	0.14	0.09	1,128,461	N.D.
ARG16	Laguna Grande	Argentina	Protected	7,672	0.00	0.05	101,599	N.D.
ARG17	Laguna Guayatayoc	Argentina	Not protected	108,520	0.16	0.07	1,197,618	N.D.
ARG18	Laguna La Alumbrera	Argentina	Not protected	10,796	0.18	0.05	120,625	N.D.
ARG19	Laguna Purulla	Argentina	Not protected	7,796	0.04	0.05	98,826	N.D.
ARG20	Lagunas Runtuyoc - Los Enamorados	Argentina	Not protected	2,494	0.30	0.10	40,797	N.D.
ARG21	Lagunas San Miguel y El Sauce	Argentina	Not protected	2,214	0.09	0.09	248,492	N.D.
ARG22	Lagunillas	Argentina	Protected	551	0.00	0.08	6,454	N.D.
ARG23	Lotes 32 y 33, Maíz Gordo	Argentina	Partial	23,032	0.42	0.07	797,486	N.D.
ARG24	Luracatao y Valles Calchaquíes	Argentina	Not protected	267,288	0.14	0.07	4,861,356	N.D.

CEPF code	KBA	Country	Protection status	Area (ha)	Mean vulnerability	Relative biodiversity value	Total carbon stored (tonnes)	Mean fresh-water score
ARG25	Monumento Natural Laguna de Los Pozuelos	Argentina	Protected	15,870	0.19	0.09	55,214	N.D.
ARG26	Pampichuela	Argentina	Protected	1,828	0.17	0.13	182,248	N.D.
ARG27	Parque Nacional Baritú	Argentina	Protected	65,123	0.04	0.14	10,830,188	N.D.
ARG28	Parque Nacional Calilegua	Argentina	Protected	68,333	0.05	0.15	9,506,005	N.D.
ARG29	Parque Nacional Campo de los Alisos	Argentina	Partial	9,044	0.03	0.11	616,799	N.D.
ARG30	Parque Nacional El Rey	Argentina	Protected	35,915	0.04	0.08	4,300,128	N.D.
ARG31	Parque Provincial Cumbres Calchaquíes	Argentina	Partial	61,225	0.11	0.09	1,522,582	N.D.
ARG32	Parque Provincial La Florida	Argentina	Partial	8,392	0.10	0.13	405,829	N.D.
ARG33	Parque Provincial Laguna Pintascayoc	Argentina	Protected	14,227	0.07	0.12	2,325,102	N.D.
ARG34	Parque Provincial Los Á'uñorcos y Reserva Natural Quebrada del Portugués	Argentina	Protected	6,761	0.05	0.13	540,661	N.D.
ARG35	Pueblo Nuevo	Argentina	Protected	1,751	0.34	0.10	33,063	N.D.
ARG36	Queñoales de Santa Catalina	Argentina	Protected	9,730	0.34	0.09	93,880	N.D.
ARG37	Quebrada del Toro	Argentina	Not protected	54,938	0.15	0.08	912,574	N.D.
ARG38	Río Los Sosa	Argentina	Not protected	2,436	0.64	0.05	202,584	N.D.
ARG39	Río Santa María	Argentina	Protected	9,339	0.14	0.10	1,422,887	N.D.
ARG40	Río Seco	Argentina	Not protected	30,654	0.03	0.10	4,256,195	N.D.
ARG41	Reserva Natural de La Angostura	Argentina	Partial	1,508	0.45	0.13	12,749	N.D.
ARG42	Reserva Natural Las Lancitas	Argentina	Partial	12,009	0.16	0.08	1,010,896	N.D.
ARG43	Reserva Provincial de Uso Múltiple Laguna Leandro	Argentina	Protected	370	0.00	0.07	3,943	N.D.
ARG44	Reserva Provincial Olaroz-Cauchari	Argentina	Partial	190,097	0.11	0.06	2,441,793	N.D.
ARG45	Reserva Provincial Santa Ana	Argentina	Partial	15,586	0.01	0.05	1,701,067	N.D.
ARG46	Reserva Provincial y de la Biosfera Laguna Blanca	Argentina	Partial	522,754	0.03	0.04	5,914,372	N.D.
ARG47	Salar del Hombre Muerto	Argentina	Not protected	58,811	0.06	0.06	646,989	N.D.
ARG48	San Francisco-Río Jordan	Argentina	Protected	9,895	0.12	0.15	1,092,131	N.D.

CEPF code	KBA	Country	Protection status	Area (ha)	Mean vulnerability	Relative biodiversity value	Total carbon stored (tonnes)	Mean fresh-water score
ARG49	San Lucas	Argentina	Partial	25,926	0.13	0.05	493,153	N.D.
ARG50	Santa Victoria, Cañani y Cayotal	Argentina	Protected	25,543	0.05	0.10	833,204	N.D.
ARG51	Sierra de Ambato	Argentina	Not protected	76,195	0.05	0.09	780,457	N.D.
ARG52	Sierra de Medina	Argentina	Not protected	38,389	0.13	0.09	2,185,611	N.D.
ARG53	Sierra de San Javier	Argentina	Protected	11,792	0.35	0.07	951,037	N.D.
ARG54	Sierra de Santa Victoria	Argentina	Not protected	38,983	0.17	0.06	475,922	N.D.
ARG55	Sierra de Zenta	Argentina	Protected	37,689	0.08	0.11	1,968,635	N.D.
ARG56	Sierras de Carahuasi	Argentina	Not protected	102,695	0.08	0.07	2,146,725	N.D.
ARG57	Sierras de Puesto Viejo	Argentina	Not protected	9,075	0.25	0.09	556,097	N.D.
ARG58	Sistema de lagunas de Vilama-Pululos	Argentina	Protected	303,783	0.04	0.05	3,107,167	N.D.
ARG59	Socompá-Llullaillaco	Argentina	Protected	87,293	0.08	0.03	1,225,400	N.D.
ARG60	Tiraxi y Las Capillas	Argentina	Protected	13,008	0.14	0.11	1,529,318	N.D.
ARG61	Trancas	Argentina	Not protected	32,092	0.48	0.08	668,271	N.D.
ARG62	Valle Colorado y Valle Grande	Argentina	Protected	9,743	0.14	0.09	305,191	N.D.
ARG63	Valley of Tafi	Argentina	Partial	33,551	0.27	0.14	647,740	N.D.
ARG64	Yala	Argentina	Protected	4,090	0.38	0.07	407,658	N.D.
ARG65	Yavi y Yavi Chico	Argentina	Not protected	4,570	0.43	0.08	53,897	N.D.
BOL1	Alto Amboró	Bolivia	Protected	399,213	0.01	0.30	111,704,928	0.02
BOL2	Alto Carrasco and surrounding areas	Bolivia	Protected	638,324	0.06	0.41	153,758,554	0.03
BOL3	Apolo	Bolivia	Partial	177,181	0.06	0.33	24,025,575	0.01
BOL4	Azurduy	Bolivia	Not protected	133,353	0.14	0.09	15,816,594	0.01
BOL5	Bosque de Polylepis de Madidi	Bolivia	Protected	94,614	0.07	0.45	18,436,494	0.02
BOL6	Bosque de Polylepis de Mina Elba	Bolivia	Protected	5,778	0.01	0.35	513,230	0.19
BOL7	Bosque de Polylepis de Sanja Pampa	Bolivia	Protected	1,878	0.28	0.43	293,930	0.19
BOL8	Bosque de Polylepis de Taquesi	Bolivia	Not protected	3,456	0.00	0.41	498,406	0.30
BOL9	Cerro Q'ueñwa Sandora	Bolivia	Not protected	57,876	0.14	0.17	893,529	0.04

CEPF code	KBA	Country	Protection status	Area (ha)	Mean vulnerability	Relative biodiversity value	Total carbon stored (tonnes)	Mean fresh-water score
BOL10	Chulumani - Cajuata	Bolivia	Not protected	104,736	0.07	0.49	20,095,319	0.14
BOL11	Comarapa	Bolivia	Not protected	5,888	0.53	0.25	355,465	0.02
BOL12	Coroico	Bolivia	Not protected	25,569	0.00	0.43	6,407,981	0.02
BOL13	Cotapata	Bolivia	Partial	265,202	0.05	0.55	59,110,692	0.13
BOL14	Cristal Mayu y Alrededores	Bolivia	Not protected	29,441	0.14	0.58	8,376,803	0.17
BOL15	Cuenca Cotacajes	Bolivia	Not protected	76,410	0.15	0.28	5,812,703	0.04
BOL16	Cuencas de Ríos Caine y Mizque	Bolivia	Not protected	339,205	0.12	0.08	11,782,133	0.02
BOL17	Huayllamarka	Bolivia	Not protected	74,814	0.08	0.09	2,883,137	0.00
BOL18	Lag Coipasa	Bolivia	Not protected	345,309	0.03	0.07	4,511,804	0.00
BOL19	Lago Poopó y Río Laka Jahuira	Bolivia	Not protected	239,129	0.01	0.10	2,177,995	0.00
BOL20	Lago Titicaca (Sector Boliviano)	Bolivia	Not protected	382,806	0.12	0.12	3,759,380	0.01
BOL21	Lagunas de Agua Dulce del Sureste de Potosí	Bolivia	Partial	310,647	0.03	0.08	4,432,771	0.00
BOL22	Lagunas Salinas del Suroeste de Potosí	Bolivia	Partial	611,736	0.02	0.10	7,396,559	0.00
BOL23	Parque nacional Sajama	Bolivia	Partial	97,238	0.10	0.09	3,805,550	0.00
BOL24	Quebrada Mojón	Bolivia	Not protected	40,427	0.22	0.14	262,032	0.03
BOL25	Río Huayllamarca	Bolivia	Not protected	5,259	0.02	0.12	231,467	0.00
BOL26	Reserva Biológica Cordillera de Sama	Bolivia	Protected	94,532	0.09	0.06	2,538,548	0.01
BOL27	Reserva Nacional de Flora y Fauna Tariquía	Bolivia	Protected	229,604	0.09	0.12	52,734,416	0.03
BOL28	Salar de Uyuni	Bolivia	Not protected	1,364,463	0.03	0.07	12,033,303	0.00
BOL29	Serranía Bella Vista	Bolivia	Not protected	33,391	0.39	0.27	6,552,519	0.01
BOL30	Tacacoma-Quiabaya y Valle de Sorata	Bolivia	Not protected	87,333	0.05	0.31	6,343,368	0.02
BOL31	Valle La Paz	Bolivia	Not protected	147,656	0.27	0.12	3,253,252	0.10
BOL32	Vertiente Sur del Parque Nacional Tunari	Bolivia	Protected	128,142	0.12	0.17	1,573,507	0.04
BOL33	Yungas Inferiores de Amboró	Bolivia	Protected	299,926	0.07	0.24	78,863,325	0.02
BOL34	Yungas Inferiores de Carrasco	Bolivia	Protected	425,537	0.05	0.38	114,141,589	0.04

CEPF code	KBA	Country	Protection status	Area (ha)	Mean vulnerability	Relative biodiversity value	Total carbon stored (tonnes)	Mean fresh-water score
BOL35	Yungas Inferiores de Isiboro-Sécure/Altamachi	Bolivia	Protected	193,813	0.00	0.27	54,663,940	0.01
BOL36	Yungas Inferiores de Madidi	Bolivia	Protected	372,951	0.01	0.29	108,089,106	0.00
BOL37	Yungas Inferiores de Pilón Lajas	Bolivia	Protected	249,858	0.03	0.30	70,696,683	0.00
BOL38	Yungas Superiores de Amboró	Bolivia	Protected	245,394	0.05	0.37	64,831,120	0.02
BOL39	Yungas Superiores de Apolobamba	Bolivia	Protected	433,346	0.08	0.33	56,054,176	0.02
BOL40	Yungas Superiores de Carrasco	Bolivia	Protected	205,748	0.07	0.47	37,343,180	0.03
BOL41	Yungas Superiores de Madidi	Bolivia	Protected	240,426	0.02	0.39	64,813,594	0.01
BOL42	Yungas Superiores de Mosetenes y Cocapata	Bolivia	Partial	337,229	0.01	0.34	100,806,850	0.02
BOL43	Zongo Valley	Bolivia	Not protected	1,475	0.11	0.60	362,151	0.19
CHI1	Lagunas Bravas	Chile	Not protected	804	0.01	0.03	5,388	N.D.
CHI2	Monumento Natural Salar de Surire	Chile	Not protected	15,815	0.41	0.06	114,162	N.D.
CHI3	Parque Nacional Lauca	Chile	Protected	127,977	0.10	0.08	1,547,552	N.D.
CHI4	Parque Nacional Salar de Huasco	Chile	Protected	108,221	0.02	0.06	1,164,016	N.D.
CHI5	Parque Nacional Volcán Isluga	Chile	Protected	151,864	0.00	0.06	2,089,522	N.D.
CHI6	Precordillera Socoroma-Putre	Chile	Not protected	5,848	0.12	0.08	76,252	N.D.
CHI7	Puquios	Chile	Not protected	29,446	0.12	0.09	460,715	N.D.
CHI8	Reserva Nacional Alto del Loa	Chile	Not protected	32,421	0.00	0.06	450,115	N.D.
CHI9	Reserva Nacional Las Vicuñas	Chile	Not protected	100,753	0.10	0.07	1,133,987	N.D.
CHI10	Reserva Nacional Los Flamencos - Soncor	Chile	Not protected	66,431	0.03	0.05	715,187	N.D.
CHI11	Salar de Piedra Parada	Chile	Not protected	2,715	0.04	0.03	35,300	N.D.
COL1	9km south of Valdivia	Colombia	Not protected	8,175	0.47	0.36	1,512,198	0.05
COL2	Agua de la Virgen	Colombia	Not protected	122	0.37	0.24	11,509	0.02
COL3	Albania	Colombia	Protected	11,034	0.01	0.48	390,150	0.10
COL4	Alto de Oso	Colombia	Not protected	348	0.25	0.46	61,013	0.21
COL5	Alto de Pisones	Colombia	Not protected	1,381	0.23	0.54	385,289	0.15
COL6	Alto Quindío	Colombia	Protected	4,582	0.12	0.43	1,026,061	0.09

CEPF code	KBA	Country	Protection status	Area (ha)	Mean vulnerability	Relative biodiversity value	Total carbon stored (tonnes)	Mean fresh-water score
COL7	Bosque de San Antonio/Km 18	Colombia	Partial	5,994	0.62	0.59	857,962	0.07
COL8	Bosques de la Falla del Tequendama	Colombia	Not protected	12,597	0.63	0.40	1,899,665	0.18
COL9	Bosques de Tolemaida, Piscilago y alrededores	Colombia	Not protected	22,758	0.54	0.18	2,388,263	0.12
COL10	Bosques del Oriente de Risaralda	Colombia	Protected	27,610	0.07	0.46	4,326,380	0.10
COL11	Bosques Montanos del Sur de Antioquia	Colombia	Partial	200,575	0.17	0.23	40,477,937	0.10
COL12	Bosques Secos del Valle del Río Chicamocha	Colombia	Partial	395,012	0.28	0.32	37,432,967	0.05
COL13	Cañón del Río Alicante	Colombia	Partial	3,271	0.01	0.23	553,877	0.13
COL14	Cañón del Río Barbas y Bremen	Colombia	Partial	11,194	0.63	0.46	1,984,087	0.10
COL15	Cañón del Río Combeima	Colombia	Not protected	7,589	0.38	0.33	1,329,683	0.10
COL16	Cañón del Río Guatiquía	Colombia	Not protected	34,160	0.24	0.39	5,847,193	0.55
COL17	Cañon del Rio Guatiqua and surroundings	Colombia	Not protected	32,742	0.26	0.39	5,625,901	0.56
COL18	Cafetales de Támesis	Colombia	Not protected	263	0.71	0.21	38,348	0.10
COL19	Carretera Ramiriqui-Zetaquira	Colombia	Not protected	10,434	0.19	0.25	1,235,045	0.08
COL20	Cerro de Pan de Azúcar	Colombia	Not protected	18,685	0.40	0.27	3,242,374	0.08
COL21	Cerro La Judía	Colombia	Partial	10,221	0.28	0.39	1,969,456	0.03
COL22	Cerro Pintado	Colombia	Not protected	12,292	0.09	0.26	2,823,778	0.08
COL23	Cerros Occidentales de Tabio y Tenjo	Colombia	Not protected	472	0.33	0.30	59,732	0.17
COL24	Chingaza Natural National Park and surrounding areas	Colombia	Protected	95,599	0.05	0.37	20,566,829	0.43
COL25	Complejo Lacustre de Fúquene, Cucunubá y Palacio	Colombia	Not protected	4,728	0.25	0.29	903,982	0.08
COL26	Cordillera de los Picachos Natural National Park	Colombia	Protected	304,154	0.02	0.29	78,817,059	0.04
COL27	Coromoro	Colombia	Not protected	17,637	0.38	0.47	2,620,456	0.11
COL28	Cuchilla de San Lorenzo	Colombia	Partial	71,601	0.19	0.38	17,026,429	0.03
COL29	Cuenca del Río Hereje	Colombia	Not protected	8,258	0.04	0.23	1,846,616	0.16
COL30	Cuenca del Río Jiménez	Colombia	Not protected	10,466	0.27	0.15	1,344,126	0.13

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COL31	Cuenca del Río San Miguel	Colombia	Not protected	9,050	0.28	0.25	1,797,884	0.16
COL32	Cuenca del Río Toche	Colombia	Not protected	24,478	0.07	0.38	4,861,061	0.09
COL33	Cuenca Hidrográfica del Río San Francisco and surrounding area	Colombia	Partial	5,453	0.46	0.33	753,977	0.29
COL34	Embalse de Punchiná y su zona de protección	Colombia	Protected	1,406	0.31	0.26	307,400	0.13
COL35	Embalse de San Lorenzo y Jaguas	Colombia	Protected	2,651	0.01	0.35	505,972	0.13
COL36	Enclave Seco del Río Dagua	Colombia	Partial	8,509	0.67	0.59	563,065	0.07
COL37	Finca la Betulia Reserva la Patasola	Colombia	Protected	1,481	0.00	0.47	411,292	0.10
COL38	Finca Paraguay	Colombia	Not protected	12,565	0.13	0.28	1,369,380	0.10
COL39	Fusagasuga	Colombia	Not protected	9,199	0.32	0.37	702,231	0.30
COL40	Granjas del Padre Luna	Colombia	Not protected	11,361	0.64	0.38	881,740	0.17
COL41	Gravilleras del Valle del Río Siecha	Colombia	Not protected	2,274	0.56	0.30	206,583	0.09
COL42	Hacienda La Victoria, Cordillera Oriental	Colombia	Not protected	13,617	0.62	0.38	1,907,011	0.17
COL43	Haciendas Ganaderas del Norte del Cauca	Colombia	Not protected	1,395	0.48	0.13	137,201	0.10
COL44	Humedales de la Sabana de Bogotá	Colombia	Not protected	20,682	0.67	0.36	1,216,824	0.20
COL45	La Empalada	Colombia	Partial	10,561	0.44	0.32	1,699,105	0.14
COL46	La Forzosa-Santa Gertrudis	Colombia	Not protected	4,106	0.14	0.33	963,805	0.07
COL47	La Salina	Colombia	Not protected	8,957	0.11	0.26	2,308,241	0.03
COL48	La Victoria	Colombia	Partial	768	0.36	0.30	123,070	0.10
COL49	Lago Cumbal	Colombia	Not protected	371	0.00	0.17	60,175	0.02
COL50	Laguna de la Cocha	Colombia	Partial	63,271	0.21	0.50	11,660,281	0.02
COL51	Laguna de Tota	Colombia	Not protected	6,264	0.08	0.23	515,860	0.04
COL52	Lagunas Bombona y Vancouver	Colombia	Partial	7,308	0.29	0.31	947,739	0.10
COL53	Loros Andinos Natural Reserve	Colombia	Not protected	53,923	0.22	0.33	9,319,077	0.08
COL54	Munchique Sur	Colombia	Not protected	28,358	0.06	0.63	5,638,617	0.13
COL55	Municipio de Pandi	Colombia	Not protected	3,289	0.61	0.34	513,002	0.12

CEPF code	KBA	Country	Protection status	Area (ha)	Mean vulnerability	Relative biodiversity value	Total carbon stored (tonnes)	Mean fresh-water score
COL56	Orquideas - Musinga - Carauta	Colombia	Protected	71,363	0.13	0.35	16,229,003	0.04
COL57	Páramo de Sonsón	Colombia	Not protected	73,042	0.36	0.42	11,384,637	0.11
COL58	Páramo Urrao	Colombia	Protected	35,297	0.05	0.27	8,464,156	0.05
COL59	Páramos del Sur de Antioquia	Colombia	Not protected	14,094	0.07	0.42	3,218,258	0.11
COL60	Páramos y Bosques Altoandinos de Génova	Colombia	Not protected	12,549	0.13	0.37	2,332,058	0.08
COL61	Parque Nacional Natural Chingaza	Colombia	Protected	87,019	0.05	0.37	18,433,592	0.42
COL62	Parque Nacional Natural Cueva de los Guácharos	Colombia	Partial	9,720	0.04	0.46	2,353,912	0.06
COL63	Parque Nacional Natural de Pisba	Colombia	Partial	58,139	0.05	0.26	9,295,970	0.05
COL64	Parque Nacional Natural El Cocuy	Colombia	Protected	364,203	0.03	0.20	65,598,590	0.05
COL65	Parque Nacional Natural Farallones de Cali	Colombia	Protected	230,440	0.05	0.57	48,466,309	0.17
COL66	Parque Nacional Natural Las Orquídeas	Colombia	Protected	35,212	0.05	0.33	8,653,474	0.04
COL67	Parque Nacional Natural Munchique	Colombia	Protected	52,107	0.04	0.56	11,577,858	0.11
COL68	Parque Nacional Natural Nevado del Huila	Colombia	Protected	175,134	0.01	0.29	38,670,093	0.11
COL69	Parque Nacional Natural Paramillo	Colombia	Protected	624,329	0.05	0.22	157,655,692	0.06
COL70	Parque Nacional Natural Puracé	Colombia	Protected	82,654	0.04	0.34	17,784,333	0.11
COL71	Parque Nacional Natural Sierra de la Macarena	Colombia	Protected	696,882	0.01	0.30	161,901,233	0.01
COL72	Parque Nacional Natural Sumapaz	Colombia	Protected	239,661	0.02	0.28	41,913,497	0.18
COL73	Parque Nacional Natural Tamá	Colombia	Protected	62,484	0.01	0.33	14,669,693	0.29
COL74	Parque Nacional Natural Tatamá	Colombia	Partial	59,414	0.03	0.36	14,369,787	0.15
COL75	Parque Natural Regional Páramo del Duende	Colombia	Partial	32,136	0.03	0.52	6,388,208	0.07
COL76	Pueblo Bello	Colombia	Not protected	1,269	0.03	0.30	242,178	0.08
COL77	Pueblo Viejo de Ura	Colombia	Not protected	15,998	0.24	0.26	1,523,041	0.06
COL78	Purace	Colombia	Not protected	80,216	0.48	0.36	10,096,920	0.11
COL79	Refugio Río Claro	Colombia	Not protected	527	0.00	0.24	74,269	0.10

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COL80	Región del Alto Calima	Colombia	Not protected	21,918	0.13	0.56	4,327,425	0.17
COL81	Reserva Biológica Cachalú	Colombia	Not protected	1,195	0.06	0.42	324,330	0.06
COL82	Reserva El Oso	Colombia	Not protected	4,998	0.07	0.40	1,124,116	0.08
COL83	Reserva Forestal Yotoco	Colombia	Protected	509	0.46	0.39	67,971	0.06
COL84	Reserva Hidrográfica, Forestal y Parque Ecológico de Río Blanco	Colombia	Protected	4,348	0.26	0.32	759,495	0.10
COL85	Reserva Natural Cajibío	Colombia	Not protected	347	0.76	0.17	36,698	0.11
COL86	Reserva Natural El Pangán	Colombia	Not protected	7,727	0.07	0.63	1,560,387	0.12
COL87	Reserva Natural Ibanasca	Colombia	Partial	2,393	0.12	0.34	480,933	0.10
COL88	Reserva Natural La Planada	Colombia	Partial	3,399	0.12	0.62	865,214	0.08
COL89	Reserva Natural Laguna de Sonso	Colombia	Not protected	926	0.14	0.13	211,001	0.06
COL90	Reserva Natural Meremberg	Colombia	Not protected	2,168	0.11	0.36	371,467	0.11
COL91	Reserva Natural Río Ñambí	Colombia	Partial	8,595	0.25	0.56	1,560,021	0.12
COL92	Reserva Natural Semillas de Agua	Colombia	Not protected	1,270	0.04	0.32	216,127	0.09
COL93	Reserva Natural Tambito	Colombia	Not protected	125	0.00	0.37	32,107	0.16
COL94	Reserva Regional Bajo Cauca Nechí	Colombia	Not protected	142,495	0.09	0.21	32,688,696	0.05
COL95	Reservas Comunitarias de Roncesvalles	Colombia	Not protected	41,374	0.25	0.32	6,924,044	0.08
COL96	San Isidro	Colombia	Not protected	11,107	0.14	0.28	1,903,596	0.09
COL97	San Sebastián	Colombia	Not protected	6,674	0.09	0.29	1,679,792	0.09
COL98	Santo Domingo	Colombia	Not protected	7,508	0.53	0.32	990,656	0.11
COL99	Santuario de Fauna y Flora Galeras	Colombia	Protected	8,884	0.19	0.22	1,734,317	0.02
COL101	Selva de Florencia	Colombia	Protected	11,629	0.07	0.64	2,577,235	0.10
COL100	Selva de Florencia	Colombia	Partial	29,507	0.22	0.59	5,493,055	0.11
COL102	Serrana de los Yarigues	Colombia	Protected	288,265	0.22	0.30	49,194,802	0.06
COL103	Serranía de las Minas	Colombia	Partial	109,935	0.26	0.42	21,441,678	0.06
COL104	Serranía de las Quinchas	Colombia	Partial	100,785	0.08	0.23	20,013,993	0.10
COL105	Serranía de los Churumbelos	Colombia	Partial	166,758	0.05	0.42	43,712,750	0.06

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COL106	Serranía de los Paraguas	Colombia	Not protected	171,967	0.27	0.57	30,535,787	0.17
COL107	Serranía de los Yariguíes	Colombia	Protected	285,533	0.21	0.30	48,654,630	0.06
COL108	Serranía de San Lucas	Colombia	Not protected	816,648	0.05	0.22	205,517,468	0.04
COL109	Serranía del Pinche	Colombia	Partial	4,870	0.26	0.56	1,239,655	0.04
COL110	Sierra Nevada de Santa Marta National Natural Park and surrounding areas	Colombia	Partial	652,714	0.07	0.36	120,881,948	0.09
COL111	Soatá	Colombia	Not protected	1,173	0.00	0.24	179,363	0.02
COL112	Tatama - Paraguas	Colombia	Not protected	190,750	0.09	0.63	41,519,328	0.20
COL113	Valle de San Salvador	Colombia	Protected	76,833	0.16	0.37	16,393,816	0.04
COL114	Valle de Sibundoy	Colombia	Not protected	27,733	0.10	0.57	5,928,760	0.05
COL115	Valle de Sibundoy & Laguna de la Cocha (expanded)	Colombia	Partial	137,362	0.05	0.52	30,684,939	0.08
COL116	Valle del Río Frío	Colombia	Partial	47,995	0.36	0.34	8,876,083	0.14
COL117	Vereda el Llano	Colombia	Not protected	3,306	0.34	0.30	524,266	0.17
COL118	Vereda Las Minas	Colombia	Not protected	10,311	0.03	0.27	2,024,930	0.06
COL119	Vereda Las Minas and surrounding area	Colombia	Not protected	11,660	0.04	0.29	2,290,771	0.06
COL120	Villavicencio	Colombia	Not protected	3,770	0.48	0.32	428,903	0.73
COL121	Serranía de Perijá	Colombia, Venezuela	Protected	402,011	0.05	0.26	55,477,975	0.04
ECU1	1 km west of Loja	Ecuador	Not protected	672	0.92	0.41	9,241	0.07
ECU2	Abra de Zamora	Ecuador	Partial	6,671	0.32	0.54	1,221,005	0.07
ECU3	Acanamá-Guashapamba-Aguirre	Ecuador	Not protected	1,995	0.44	0.35	146,518	0.11
ECU4	Agua Rica	Ecuador	Not protected	807	0.23	0.59	131,949	0.09
ECU5	Alamor-Celica	Ecuador	Not protected	6,529	0.59	0.29	712,677	0.02
ECU6	Alrededores de Amaluza	Ecuador	Not protected	109,052	0.06	0.53	25,431,922	0.06
ECU7	Antisana Ecological Reserve and surrounding areas	Ecuador	Protected	112,570	0.03	0.44	20,680,013	0.07
ECU8	Azuay Basin	Ecuador	Not protected	238	0.46	0.29	35,972	0.06

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ECU9	Bosque Protector Alto Nangaritza	Ecuador	Not protected	112,692	0.02	0.43	30,603,526	0.03
ECU10	Bosque Protector Cashca Totoras	Ecuador	Not protected	6,813	0.13	0.30	944,008	0.11
ECU11	Bosque Protector Colambo-Yacuri	Ecuador	Partial	63,919	0.06	0.29	12,401,590	0.05
ECU12	Bosque Protector Dudas-Mazar	Ecuador	Partial	72,258	0.37	0.36	7,520,351	0.06
ECU13	Bosque Protector Jatumpamba-Jorupe	Ecuador	Not protected	8,112	0.33	0.25	904,058	0.02
ECU14	Bosque Protector Los Cedros	Ecuador	Not protected	12,788	0.09	0.68	3,086,011	0.22
ECU15	Bosque Protector Molleturo Mullopungo	Ecuador	Not protected	99,964	0.15	0.31	14,286,860	0.10
ECU16	Bosque Protector Moya-Molón	Ecuador	Not protected	12,377	0.02	0.36	2,216,355	0.06
ECU17	Bosque Protector Puyango	Ecuador	Not protected	2,713	0.40	0.37	294,274	0.02
ECU18	Cañón del río Catamayo	Ecuador	Not protected	27,635	0.26	0.27	2,702,963	0.02
ECU19	Cabacera del Rio Baboso	Ecuador	Not protected	8,079	0.07	0.57	1,598,843	0.08
ECU20	Cajas-Mazán	Ecuador	Protected	31,682	0.04	0.35	4,134,164	0.11
ECU21	Catacocha	Ecuador	Not protected	3,738	0.65	0.32	279,131	0.06
ECU22	Cayambe-Coca Ecological Reserve and surrounding areas	Ecuador	Protected	408,619	0.04	0.44	88,902,782	0.05
ECU23	Cazaderos-Mangaurquillo	Ecuador	Not protected	51,006	0.22	0.19	5,202,004	0.02
ECU24	Cerro de Hayas-Naranjal	Ecuador	Not protected	2,656	0.01	0.37	433,249	0.01
ECU25	Cordillera de Huacamayos-San Isidro-Sierra Azul	Ecuador	Partial	68,714	0.03	0.63	16,869,569	0.10
ECU26	Cordillera de Kutukú	Ecuador	Not protected	191,036	0.03	0.37	47,623,393	0.05
ECU27	Cordillera del Cóndor	Ecuador	Not protected	257,018	0.03	0.43	64,784,773	0.03
ECU28	Corredor Awacachi	Ecuador	Partial	28,436	0.07	0.54	4,810,046	0.07
ECU29	Corredor Ecológico Llanganates-Sangay	Ecuador	Partial	49,417	0.02	0.51	11,456,614	0.09
ECU30	El Á□ngel-Cerro Golondrinas	Ecuador	Partial	47,788	0.11	0.30	7,869,418	0.02
ECU31	El Angel-Cerro Golondrinas and surrounding areas	Ecuador	Partial	49,887	0.11	0.31	8,550,240	0.02
ECU32	Estación Biológica Guandera-Cerro Mongus	Ecuador	Not protected	13,094	0.07	0.33	2,508,770	0.03

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ECU33	Guaranda, Gallo Rumi	Ecuador	Not protected	1,867	0.59	0.40	118,121	0.11
ECU34	Intag-Toisán	Ecuador	Not protected	65,005	0.18	0.50	11,595,702	0.15
ECU35	La Bonita-Santa Bárbara	Ecuador	Not protected	13,064	0.12	0.44	3,206,476	0.03
ECU36	La Tagua	Ecuador	Not protected	6,624	0.50	0.31	843,023	0.02
ECU37	Lago de Colta	Ecuador	Not protected	122	0.94	0.17	0	0.10
ECU38	Laguna Toreadora	Ecuador	Partial	843	0.24	0.36	100,206	0.11
ECU39	Las Guardias	Ecuador	Not protected	6,066	0.10	0.33	1,104,429	0.07
ECU40	Los Bancos-Caoni	Ecuador	Not protected	2,053	0.33	0.74	291,999	0.20
ECU41	Los Bancos-Milpe	Ecuador	Not protected	8,272	0.17	0.75	1,392,914	0.20
ECU42	Los Illinizas Ecological Reserve and surrounding areas	Ecuador	Partial	140,354	0.11	0.44	30,510,046	0.10
ECU43	Maquipucuna-Río Guayllabamba	Ecuador	Not protected	21,070	0.18	0.62	4,859,169	0.10
ECU44	Mindo and western foothills of Volcan Pichincha	Ecuador	Not protected	103,494	0.18	0.70	24,524,027	0.11
ECU45	Montañas de Zapote-Najda	Ecuador	Not protected	9,700	0.03	0.38	1,722,253	0.06
ECU46	Region between P. Nacional Sumaco Napo-Galeras & Baeza Lumbaqui	Ecuador	Not protected	88,468	0.08	0.66	20,689,635	0.05
ECU47	Palanda	Ecuador	Not protected	9,457	0.13	0.35	1,815,540	0.04
ECU48	Parque Nacional Cotopaxi	Ecuador	Protected	37,844	0.08	0.19	3,326,904	0.05
ECU49	Parque Nacional Llanganates	Ecuador	Protected	230,333	0.07	0.38	43,663,299	0.09
ECU50	Parque Nacional Podocarpus	Ecuador	Protected	147,572	0.02	0.48	38,925,218	0.05
ECU51	Parque Nacional Sangay	Ecuador	Protected	535,892	0.02	0.40	105,884,734	0.07
ECU52	Parque Nacional Sumaco-Napo Galeras	Ecuador	Protected	220,148	0.06	0.59	54,882,668	0.05
ECU53	Pilaló	Ecuador	Not protected	335	0.24	0.48	44,922	0.10
ECU54	Río Caoní	Ecuador	Not protected	9,101	0.37	0.58	1,450,507	0.20
ECU55	Refugio de Vida Silvestre Pasochoa	Ecuador	Partial	701	0.18	0.25	145,122	0.07
ECU56	Reserva Buenaventura	Ecuador	Not protected	351	0.70	0.33	72,950	0.04
ECU57	Reserva Comunal Bosque de	Ecuador	Not protected	1,944	0.00	0.32	429,972	0.05

CEPF code	KBA	Country	Protection status	Area (ha)	Mean vulnerability	Relative biodiversity value	Total carbon stored (tonnes)	Mean fresh-water score
	Angashcola							
ECU58	Reserva Ecológica Antisana	Ecuador	Protected	103,578	0.03	0.42	18,718,501	0.07
ECU59	Reserva Ecológica Cayambe-Coca	Ecuador	Protected	394,406	0.04	0.43	85,544,291	0.05
ECU60	Reserva Ecológica Cofán-Bermejo	Ecuador	Partial	56,092	0.04	0.36	13,880,057	0.04
ECU61	Reserva Ecológica Cotacachi-Cayapas	Ecuador	Partial	369,936	0.07	0.56	74,520,837	0.13
ECU62	Reserva Ecológica Los Illinizas y alrededores	Ecuador	Protected	125,932	0.11	0.43	27,720,362	0.09
ECU63	Reserva Natural Tumbesia-La Ceiba-Zapotillo	Ecuador	Not protected	19,377	0.26	0.15	1,640,420	0.02
ECU64	Reserva Tapichalaca	Ecuador	Not protected	1,965	0.15	0.43	474,829	0.05
ECU65	Reserva Yunguilla	Ecuador	Not protected	769	0.39	0.32	92,000	0.04
ECU66	Rio Toachi-Chiriboga	Ecuador	Not protected	72,084	0.17	0.64	17,205,041	0.08
ECU67	Selva Alegre	Ecuador	Not protected	11,474	0.30	0.28	1,420,607	0.11
ECU68	Sumaco Napo Galeras and surrounding areas	Ecuador	Protected	210,438	0.06	0.61	51,953,130	0.05
ECU69	Tambo Negro	Ecuador	Not protected	1,946	0.29	0.23	212,330	0.02
ECU70	Territorio Étnico Awá y alrededores	Ecuador	Not protected	204,930	0.10	0.47	39,023,326	0.06
ECU71	Tiquibuzo	Ecuador	Not protected	4,965	0.50	0.27	544,652	0.11
ECU72	Toachi	Ecuador	Not protected	4,305	0.19	0.61	501,092	0.17
ECU73	Utuana-Bosque de Hanne	Ecuador	Not protected	338	0.35	0.23	52,209	0.02
ECU74	Valle de Guayllabamba	Ecuador	Not protected	24,364	0.35	0.45	656,276	0.09
ECU75	Volcán Atacazo	Ecuador	Not protected	9,317	0.25	0.26	1,294,003	0.08
ECU76	West of the Páramo de Apagua	Ecuador	Not protected	1,860	0.50	0.26	49,743	0.10
ECU77	Yanuncay-Yanasacha	Ecuador	Not protected	39,681	0.12	0.36	4,000,504	0.10
ECU78	Yungilla	Ecuador	Not protected	995	0.11	0.30	116,391	0.07
ECU79	Zumba-Chito	Ecuador	Not protected	13,968	0.23	0.33	2,535,242	0.04
PER1	17 km southeast of Aucayacu	Peru	Not protected	975	0.00	0.31	230,039	0.03
PER2	20 km NW of Boca Apua	Peru	Protected	232,949	0.00	0.28	64,500,708	0.01

CEPF code	KBA	Country	Protection status	Area (ha)	Mean vulnerability	Relative biodiversity value	Total carbon stored (tonnes)	Mean fresh-water score
PER3	6 km south of Ocobamba	Peru	Not protected	76,851	0.05	0.38	7,216,590	0.01
PER4	7 km East of Chachapoyas	Peru	Not protected	2,896	0.01	0.55	739,323	0.02
PER5	Abra Málaga-Vilcanota	Peru	Partial	31,083	0.07	0.39	2,414,633	0.01
PER6	Abra Pardo de Miguel	Peru	Partial	4,195	0.04	0.64	795,670	0.02
PER7	Abra Patricia - Alto Mayo	Peru	Partial	353,411	0.02	0.57	88,349,674	0.02
PER8	Abra Tangarana	Peru	Protected	3,673	0.01	0.37	1,075,227	0.01
PER9	Abra Tapuna	Peru	Not protected	6,096	0.09	0.07	4,196	0.02
PER10	Alto Valle del Saña	Peru	Partial	48,028	0.23	0.12	4,867,919	0.04
PER11	Alto Valle Santa Eulalia-Milloc	Peru	Not protected	19,698	0.17	0.10	563,806	0.36
PER12	Aypate	Peru	Not protected	973	0.12	0.21	186,729	0.05
PER13	Bagua	Peru	Not protected	5,160	0.25	0.32	207,679	0.02
PER14	Between Balsa Puerto and Moyabamba	Peru	Not protected	224,397	0.02	0.36	55,999,572	0.02
PER15	Bosque de Cuyas	Peru	Not protected	2,165	0.22	0.18	333,867	0.02
PER16	Calendin	Peru	Not protected	7,628	0.42	0.20	0	0.07
PER18	Carpish	Peru	Not protected	211,340	0.15	0.45	34,168,389	0.03
PER17	Carpish	Peru	Not protected	203,317	0.15	0.44	32,697,552	0.03
PER19	Carretera Otuzco-Huamachuco 2	Peru	Not protected	5,229	0.19	0.21	29,607	0.05
PER20	Cerro Chinguela	Peru	Not protected	13,523	0.07	0.33	2,779,839	0.05
PER21	Cerro Huanzalá-Huallanca	Peru	Not protected	6,325	0.34	0.09	233,529	0.04
PER22	Chalhuanca	Peru	Not protected	1,428	0.11	0.10	0	0.02
PER23	Champará	Peru	Not protected	31,195	0.18	0.14	1,777,809	0.08
PER24	Chiguata	Peru	Not protected	30,501	0.21	0.08	1,060,891	0.02
PER25	Chinchipe	Peru	Not protected	34,556	0.30	0.36	2,804,235	0.02
PER26	Conchamarca	Peru	Not protected	3,661	0.27	0.23	0	0.02
PER27	Cordillera Carabaya	Peru	Not protected	24,612	0.07	0.34	3,093,692	0.06
PER29	Cordillera de Colán	Peru	Partial	134,874	0.00	0.60	34,803,452	0.02
PER28	Cordillera de Colán	Peru	Protected	63,667	0.00	0.57	16,395,873	0.02

CEPF code	KBA	Country	Protection status	Area (ha)	Mean vulnerability	Relative biodiversity value	Total carbon stored (tonnes)	Mean fresh-water score
PER30	Cordillera de Huancabamba	Peru	Not protected	50,734	0.29	0.33	3,719,686	0.06
PER31	Cordillera del Cóndor	Peru	Partial	1,664,008	0.01	0.29	469,850,903	0.01
PER32	Cordillera Huayhuash y Nor-Oyón	Peru	Protected	74,497	0.07	0.10	907,281	0.06
PER33	Cordillera Vilcabamba	Peru	Partial	2,184,234	0.02	0.27	588,797,329	0.01
PER34	Cordillera Yanachaga	Peru	Protected	105,017	0.01	0.44	24,849,184	0.02
PER35	Cosñipata Valley	Peru	Not protected	79,499	0.02	0.44	21,935,807	0.02
PER36	Cotahuasi	Peru	Protected	451,539	0.14	0.04	10,462,747	0.01
PER37	Covire	Peru	Partial	61,345	0.17	0.11	2,075,431	0.02
PER38	Cullcui	Peru	Not protected	1,619	0.07	0.21	118,059	0.03
PER39	Cutervo National Park and surrounding areas	Peru	Partial	5,714	0.05	0.18	853,171	0.10
PER40	Daniel Alomias Robles	Peru	Not protected	6,324	0.36	0.35	1,342,930	0.02
PER41	El Molino	Peru	Not protected	116,438	0.20	0.20	1,583,747	0.04
PER42	Huamba	Peru	Not protected	2,551	0.06	0.32	413,355	0.05
PER43	Jesús del Monte	Peru	Protected	4,966	0.00	0.35	1,219,969	0.01
PER44	Kosnipata Carabaya	Peru	Not protected	86,512	0.05	0.56	21,188,163	0.02
PER45	La Cocha	Peru	Not protected	18,185	0.12	0.27	3,150,771	0.03
PER46	La Esperanza	Peru	Not protected	1,558	0.06	0.14	63,883	0.18
PER47	Lacco-Yavero_Megantoni	Peru	Partial	121,653	0.02	0.46	30,703,686	0.01
PER48	Lago de Junín	Peru	Protected	49,714	0.09	0.17	2,852,495	0.10
PER49	Lago Lagunillas	Peru	Not protected	4,514	0.02	0.05	110,277	0.06
PER50	Lagos Yanacocha	Peru	Not protected	2,440	0.08	0.29	124,028	0.01
PER51	Laguna de Chacas	Peru	Not protected	848	0.17	0.13	48,772	0.03
PER52	Laguna de los Cóndores	Peru	Not protected	261,648	0.02	0.34	64,082,167	0.02
PER53	Laguna Gwengway	Peru	Not protected	14,678	0.13	0.37	1,489,948	0.02
PER54	Laguna Maquera	Peru	Not protected	120	0.78	0.05	3,789	0.06
PER55	Laguna Umayo	Peru	Not protected	25,340	0.35	0.11	230,353	0.02
PER56	Lagunas de Huacarpay	Peru	Not protected	3,373	0.62	0.15	18,935	0.02

CEPF code	KBA	Country	Protection status	Area (ha)	Mean vulnerability	Relative biodiversity value	Total carbon stored (tonnes)	Mean fresh-water score
PER57	Llamaquizú stream	Peru	Partial	20,967	0.15	0.28	5,964,878	0.02
PER58	Los Chilchos to Leymebamba Trail	Peru	Not protected	2,353	0.00	0.42	530,478	0.02
PER59	Mandorcasa	Peru	Partial	62,444	0.04	0.28	4,499,388	0.01
PER60	Manu	Peru	Protected	1,589,517	0.02	0.36	439,513,660	0.01
PER61	Marcapomacocha	Peru	Not protected	20,636	0.10	0.09	260,345	1.00
PER62	Maruncunca	Peru	Not protected	49,712	0.12	0.35	12,777,578	0.01
PER63	Milpo	Peru	Not protected	4,850	0.10	0.45	814,614	0.03
PER64	Mina Inca	Peru	Not protected	2,265	0.05	0.31	659,489	0.05
PER65	Moyobamba	Peru	Not protected	91,528	0.12	0.43	15,589,910	0.02
PER66	Ocobamba-Cordillera de Vilcanota	Peru	Not protected	67,862	0.04	0.52	13,859,454	0.01
PER67	Paltashaco	Peru	Not protected	3,350	0.09	0.15	268,179	0.04
PER68	Pampas Pucacocha y Curicocha	Peru	Not protected	21,581	0.25	0.09	648,062	0.73
PER69	Parque Nacional Cordillera Azul	Peru	Protected	1,316,593	0.00	0.30	368,962,946	0.01
PER70	Parque Nacional Huascarán	Peru	Protected	325,361	0.06	0.11	12,933,041	0.05
PER71	Parque Nacional Tingo María	Peru	Protected	4,579	0.25	0.39	1,287,816	0.03
PER72	Phara	Peru	Not protected	12,276	0.00	0.34	3,385,058	0.01
PER73	Playa Pampa	Peru	Not protected	1,176	0.03	0.51	304,756	0.04
PER74	Previsto	Peru	Not protected	6,475	0.14	0.37	1,364,912	0.02
PER75	Quincemil	Peru	Not protected	58,324	0.05	0.40	13,828,426	0.03
PER76	Ramis y Arapa (Lago Titicaca, sector Peruano)	Peru	Not protected	444,218	0.02	0.13	6,359,640	0.01
PER77	Río Abiseo y Tayabamba	Peru	Protected	309,652	0.01	0.36	67,991,085	0.01
PER78	Río Cajamarca	Peru	Not protected	37,871	0.37	0.16	318,854	0.10
PER79	Río Mantaro-Cordillera Central	Peru	Not protected	13,428	0.09	0.26	1,984,726	0.04
PER80	Río Marañón	Peru	Not protected	106,116	0.09	0.26	4,071,538	0.05
PER81	Reserva Comunal El Sira	Peru	Protected	588,463	0.00	0.24	168,275,962	0.01
PER82	Reserva Nacional Pampa Galeras	Peru	Protected	7,395	0.19	0.08	68,260	0.02
PER83	Reserva Nacional Salinas y Aguada	Peru	Protected	337,737	0.14	0.07	11,440,455	0.05

CEPF code	KBA	Country	Protection status	Area (ha)	Mean vulnerability	Relative biodiversity value	Total carbon stored (tonnes)	Mean fresh-water score
	Blanca							
PER84	Rio Utcubamba	Peru	Not protected	35,534	0.17	0.59	5,750,863	0.02
PER85	Runtacocha-Morococha	Peru	Not protected	33,477	0.14	0.16	275,455	0.01
PER86	San Jose de Lourdes	Peru	Not protected	5,005	0.16	0.49	643,227	0.03
PER87	San Jose de Secce	Peru	Not protected	3,447	0.09	0.15	239,219	0.02
PER88	San Marcos	Peru	Not protected	4,477	0.41	0.20	40,704	0.06
PER89	Sandia	Peru	Not protected	33,077	0.07	0.39	5,204,116	0.02
PER90	Santuario Histórico Machu Picchu	Peru	Protected	34,690	0.03	0.43	4,311,769	0.01
PER91	Santuario Nacional del Ampay	Peru	Protected	3,577	0.08	0.22	341,494	0.01
PER92	Santuario Nacional Tabaconas-Namballe	Peru	Protected	33,674	0.00	0.35	8,506,325	0.05
PER93	Tarapoto	Peru	Partial	184,514	0.14	0.40	40,614,818	0.01
PER94	Toldo	Peru	Not protected	2,864	0.30	0.28	351,682	0.05
PER95	Valcón	Peru	Not protected	1,882	0.15	0.39	272,517	0.04
PER96	Yauli	Peru	Not protected	3,666	0.12	0.08	0	0.03
VEN1	Cordillera de Caripe	Venezuela	Partial	604,643	0.11	0.32	43,921,073	0.08
VEN2	El Avila National Park and surrounding areas	Venezuela	Protected	115,129	0.12	0.40	13,355,951	0.16
VEN3	Monumento Natural Pico Codazzi	Venezuela	Protected	15,343	0.01	0.53	1,614,148	0.20
VEN4	Parque Nacional El Á□vila	Venezuela	Protected	107,269	0.09	0.39	12,346,345	0.15
VEN5	Parque Nacional El Guácharo	Venezuela	Protected	46,191	0.02	0.29	5,346,565	0.10
VEN6	Parque Nacional El Tamá	Venezuela	Protected	165,424	0.06	0.29	18,428,058	0.21
VEN7	Parque Nacional Guaramacal	Venezuela	Protected	21,313	0.03	0.30	2,222,711	0.12
VEN8	Parque Nacional Guatopo	Venezuela	Partial	156,405	0.05	0.21	20,182,040	0.31
VEN9	Parque Nacional Henri Pittier	Venezuela	Protected	137,246	0.07	0.51	14,794,355	0.13
VEN10	Parque Nacional Macarao	Venezuela	Protected	21,830	0.03	0.52	2,007,409	0.20
VEN11	Parque Nacional Páramos Batallón y La Negra	Venezuela	Protected	124,281	0.07	0.29	7,332,908	0.07
VEN12	Parque Nacional Perijá	Venezuela	Protected	381,355	0.04	0.26	51,188,555	0.04

CEPF code	KBA	Country	Protection status	Area (ha)	Mean vulnerability	Relative biodiversity value	Total carbon stored (tonnes)	Mean fresh-water score
VEN13	Parque Nacional San Esteban	Venezuela	Protected	55,571	0.08	0.44	5,505,952	0.11
VEN14	Parque Nacional Sierra La Culata	Venezuela	Protected	244,428	0.05	0.33	13,101,063	0.04
VEN15	Parque Nacional Sierra Nevada	Venezuela	Protected	337,605	0.04	0.29	26,859,110	0.07
VEN16	Parque Nacional Tapo-Caparo	Venezuela	Protected	226,536	0.14	0.22	28,431,060	0.04
VEN17	Parque Nacional Terepaima	Venezuela	Partial	22,378	0.21	0.19	2,239,370	0.15
VEN18	Parque Nacional Yacambú	Venezuela	Partial	39,692	0.08	0.22	5,283,889	0.13
VEN19	Parque Nacional Yurubí	Venezuela	Protected	29,690	0.06	0.27	4,444,976	0.08
VEN20	Peninsula de Paria National Park	Venezuela	Partial	50,489	0.01	0.29	5,343,150	0.00
VEN21	Páramos Batallón and La Negra National Parks and surrounding areas	Venezuela	Partial	183,435	0.10	0.30	11,434,141	0.06
VEN22	Refugio de Fauna Silvestre y Reserva de Pesca Parque Nacional Dinira	Venezuela	Protected	57,534	0.02	0.26	4,803,050	0.11
VEN23	Sierra La Culata and Sierra Nevada National Parks and surrounding areas	Venezuela	Protected	647,622	0.06	0.31	43,414,087	0.05
VEN24	Tamá	Venezuela	Protected	259,414	0.07	0.27	34,350,793	0.25
VEN25	Tostós	Venezuela	Not protected	8,202	0.07	0.30	549,313	0.12
VEN26	Zona Protectora Macizo Montañoso del Turimiquire	Venezuela	Not protected	558,453	0.12	0.32	38,791,861	0.08
VEN27	Zona Protectora San Rafael de Guasare	Venezuela	Not protected	476,981	0.22	0.22	42,297,957	0.07

Appendix 5b. Trigger Species of KBAs with High Relative Biodiversity Value in the Tropical Andes Hotspot

KBA name	Origin[1]	Trigger species[2]
Bolivia		
Alto Carrasco and surrounding areas	AZE	Plant: *Passiflora chaparensis*, *Dicliptera palmariensis, Justicia chapareensis, Siphocampylus reflexus, Siphonandra boliviana* Amphibian: *Gastrotheca lauzuricae, Hyloscirtus chlorosteus, Psychrophrynella adenopleura, Telmatobius yuracare* Bird: *Lipaugus uropygialis* Mammal: *Oxymycterus hucucha*
Bosque de Polylepis de Madidi	IBA	Bird: *Tangara meyerdeschauenseei, Cinclodes aricomae, Anairetes alpinus*
Bosque de Polylepis de Sanja Pampa	IBA	Bird: *Cinclodes aricomae, Anairetes alpinus*
Bosque de Polylepis de Taquesi	IBA	Bird: *Anairetes alpinus*
Chulumani - Cajuata	new	Plant: *Brunellia coroicoana, Passiflora buchtienii* Amphibian: *Psychrophrynella pinguis* Mammal: *Oxymycterus hucucha*
Coroico	AZE	Amphibian: *Yunganastes bisignatus*
Cotapata	new	Plant: *Passiflora macropoda, Passiflora insignis, Brunellia coroicoana, Centropogon brittonianus, Centropogon gloriosus, Cyathea arnecornelii, Siphocampylus dubius, Siphocampylus sparsipilus, Sphyrospermum sessiliflorum* Amphibian: *Oreobates zongoensis, Yunganastes bisignatus, Psychrophrynella chacaltaya, Phrynopus laplacai* Bird: *Cinclodes aricomae*
Cristal Mayu y Alrededores	IBA	Bird: *Terenura sharpei*
Yungas Inferiores de Pilón Lajas	IBA	Amphibian: *Atelopus tricolor*
Zongo Valley	AZE	Amphibian: *Oreobates zongoensis*
Colombia		
Albania	AZE	Amphibian: *Niceforonia adenobrachia*
Alto de Oso	AZE	Amphibian: *Pristimantis albericoi*
Alto de Pisones	IBA	Bird: *Vireo masteri, Bangsia aureocincta, Bangsia melanochlamys, Chlorochrysa nitidissima*
Alto Quindío	IBA	Bird: *Grallaria alleni, Grallaria milleri, Grallaria rufocinerea, Leptosittaca branickii*
Bosque de San Antonio/Km 18	IBA	Amphibian: *Strabomantis ruizi* Bird: *Dendroica cerulea*
Bosques del Oriente de Risaralda	IBA	Amphibian: *Niceforonia adenobrachia, Atelopus quimbaya* Bird: *Hapalopsittaca fuertesi, Hypopyrrhus pyrohypogaster, Penelope perspicax, Grallaria milleri, Bolborhynchus ferrugineifrons*
Cañón del Río Barbas y Bremen	IBA	Amphibian: *Atelopus quimbaya* Bird: *Chlorochrysa nitidissima, Penelope perspicax*
Coromoro	AZE	Amphibian: *Atelopus monohernandezii, Pristimantis acutirostris*
Enclave Seco del Río Dagua	IBA	Amphibian: *Ranitomeya bombetes* Bird: *Penelope ortoni*
Finca la Betulia Reserva la Patasola	IBA	Bird: *Penelope perspicax*
Munchique Sur	new	Amphibian: *Atelopus famelicus* Bird: *Eriocnemis isabellae, Eriocnemis mirabilis*

KBA name	Origin[1]	Trigger species[2]
Páramo de Sonsón	AZE	Amphibian: *Atelopus sonsonensis, Atopophrynus syntomopus, Pristimantis bernali, Rhinella rostrata, Hypodactylus latens*
Páramos del Sur de Antioquia	IBA	Amphibian: *Atopophrynus syntomopus* Bird: *Capito hypoleucus, Hypopyrrhus pyrohypogaster*
Parque Nacional Natural Cueva de los Guácharos	IBA	Bird: *Hypopyrrhus pyrohypogaster, Tinamus osgoodi, Leptosittaca branickii*
Parque Nacional Natural Farallones de Cali	IBA / AZE	Amphibian: *Atelopus pictiventris, Pristimantis capitonis, Pristimantis deinops* Bird: *Coeligena orina* Mammal: *Balantiopteryx infusca*
Parque Nacional Natural Munchique	IBA / AZE	Amphibian: *Colostethus alacris, Atelopus famelicus, Atelopus longibrachius, Gastrotheca trachyceps, Pristimantis cacao* Bird: *Eriocnemis mirabilis, Diglossa gloriosissima*
Parque Natural Regional Páramo del Duende	IBA	Amphibian: *Centrolene heloderma, Pristimantis chrysops* Bird: *Leptosittaca branickii*
Región del Alto Calima	IBA	Amphibian: *Gastrotheca angustifrons* Bird: *Cephalopterus penduliger*
Reserva Biológica Cachalú	IBA	Bird: *Odontophorus strophium, Macroagelaius subalaris, Coeligena prunellei*
Reserva Natural El Pangán	IBA	Amphibian: *Pristimantis siopelus* Bird: *Penelope ortoni*
Reserva Natural La Planada	IBA / AZE	Amphibian: *Pristimantis siopelus, Pristimantis sulculus* Bird: *Oreothraupis arremonops, Glaucidium nubicola, Odontophorus melanonotus*
Reserva Natural Río Ñambí	IBA	Amphibian: *Pristimantis siopelus* Bird: *Neomorphus radiolosus, Penelope ortoni*
Selva de Florencia	IBA	Amphibian: *Pristimantis torrenticola, Pristimantis tribulosus, Pristimantis actinolaimus* Bird: *Hypopyrrhus pyrohypogaster, Atlapetes flaviceps*
Selva de Florencia	AZE	Amphibian: *Pristimantis torrenticola, Pristimantis tribulosus, Pristimantis actinolaimus, Pristimantis lichenoides, Pristimantis veletis*
Serranía de las Minas	IBA	Amphibian: *Pristimantis hernandezi* *Scytalopus rodriguezi, Leptotila conoveri* Reptile: *Ptychoglossus bicolor*
Serranía de los Churumbelos	IBA	Amphibian: *Hypodactylus dolops* Bird: *Grallaricula cucullata*
Serranía de los Paraguas	IBA	Bird: *Penelope perspicax, Bangsia aureocincta, Dysithamnus occidentalis, Oreothraupis arremonops*
Serranía del Pinche	AZE	Bird: *Eriocnemis isabellae*
Sierra Nevada de Santa Marta National Natural Park and surrounding areas	AZE	Amphibian: *Atelopus arsyecue, Atelopus carrikeri, Atelopus laetissimus, Atelopus nahumae, Colostethus ruthveni, Cryptobatrachus boulengeri, Pristimantis insignitus, Pristimantis ruthveni* Reptile: *Anadia pulchella* Bird: *Campylopterus phainopeplus, Troglodytes monticola, Ramphomicron dorsale, Myiotheretes pernix, Pyrrhura viridicata* Mammal: *Santamartamys rufodorsalis, Thomasomys monochromos, Proechimys mincae*
Tatama – Paraguas (candidate)	new	Amphibian: *Atelopus chocoensis, Anomaloglossus atopoglossus* Mammal: *Balantiopteryx infusca*
Valle de Sibundoy	AZE	Amphibian: *Gastrotheca ruizi*
Valle de Sibundoy & Laguna de la Cocha (expanded AZE)	new	Plant: *Passiflora colombiana*, *Passiflora uribei* Amphibian: *Nymphargus magacheirus, Gastrotheca ruizi, Atelopus ardila, Pristimantis gladiator, Hyloscirtus psarolaimus*
Ecuador		
1 km west of Loja	AZE	Amphibian: *Rhinella amabilis*

KBA name	Origin[1]	Trigger species[2]
Abra de Zamora	AZE	Amphibian: *Gastrotheca psychrophila, Pristimantis balionotus, Pristimantis percultus, Telmatobius cirrhacelis*
Agua Rica	AZE	Amphibian: *Phyllomedusa ecuatoriana*
Alrededores de Amaluza	new	Amphibian: *Atelopus nepiozomus, Pristimantis baryecuus, Pristimantis pycnodermis, Hyloscirtus pacha, Hyloxalus peculiaris, Hyloxalus pumilus* Reptile: Stenocercus festae Mammal: *Oreonax flavicauda*
Antisana Ecological Reserve and surrounding areas	AZE	Amphibian: *Pristimantis acerus, Pristimantis ignicolor, Pristimantis lividus*
Bosque Protector Alto Nangaritza	IBA	Amphibian: *Atelopus pachydermus* Bird: *Hemitriccus cinnamomeipectus, Pyrrhura albipectus*
Bosque Protector los Cedros	IBA	Bird: *Neomorphus radiolosus*
Cabecera del Rio Baboso	AZE	Amphibian: *Andinophryne colomai*
Cayambe-Coca Ecological Reserve and surrounding areas	AZE	Amphibian: *Centrolene pipilatum, Nymphargus anomalus, Ranitomeya abdita,*
Cordillera de Huacamayos-San Isidro-Sierra Azul	IBA	Amphibian: *Atelopus planispina, Allobates kingsburyi, Pristimantis rubicundus* Bird: *Touit stictopterus, Galbula pastazae, Dysithamnus occidentalis, Grallaria gigantea, Grallaria alleni*
Cordillera del Cóndor	IBA	Amphibian: *Atelopus boulengeri, Pristimantis proserpens, Oreobates simmonsi, Centrolene condor, Hyloxalus mystax* Bird: *Leptosittaca branickii, Pyrrhura albipectus, Wetmorethraupis sterrhopteron, Touit stictopterus* Mammal: *Caenolestes condorensis*
Corredor Awacachi	IBA	Bird: *Micrastur plumbeus, Neomorphus radiolosus, Attila torridus*
Corredor Ecológico Llanganates-Sangay	IBA	Amphibian: *Atelopus petersi, Atelopus planispina, Hyloxalus marmoreoventris* Bird: *Galbula pastazae, Dysithamnus occidentalis* Mammal: *Tapirus pinchaque*
Intag-Toisán	IBA	Bird: *Odontophorus melanonotus*
La Bonita-Santa Bárbara	IBA	Bird: *Grallaria rufocinerea*
Los Bancos-Milpe	IBA	Amphibian: *Strabomantis helonotus* Bird: *Odontophorus melanonotus, Vireo masteri*
Los Illinizas Ecological Reserve and surrounding areas	AZE	Amphibian: *Centrolene gemmatum, Hyloscirtus ptychodactylus, Pristimantis thymalopsoides, Pristimantis actites, Pristimantis nyctophylax* Reptile: *Riama oculata*
Maquipucuna-Río Guayllabamba	IBA	Amphibian: *Hyloxalus maquipucuna* Bird: *Odontophorus melanonotus, Glaucidium nubicola, Grallaria gigantea, Grallaria alleni*
Mindo and western foothills of Volcan Pichincha	IBA / AZE	Amphibian: *Pristimantis hamiotae, Pristimantis sobetes, Pristimantis luteolateralis, Pristimantis dissimulatus, Pristimantis eugeniae, Hyloxalus maquipucuna, Centrolene ballux* Reptile: *Riama oculata, Atractus modestus* Bird: *Eriocnemis nigrivestis, Glaucidium nubicola, Oreothraupis arremonops, Odontophorus melanonotus, Grallaria alleni, Grallaria gigantea* Mammal: *Mindomys hammondi*
Parque Nacional Podocarpus	IBA	Amphibian: *Atelopus podocarpus, Telmatobius cirrhacelis, Gastrotheca psychrophila, Pristimantis balionotus, Pristimantis percultus, Pholidobolus annectens* Reptile: *Pholidobolus annectens*, *Bothrops lojanus*

KBA name	Origin[1]	Trigger species[2]
		Bird: *Grallaria ridgelyi*
Parque Nacional Sangay	IBA	Amphibian: *Caecilia crassisquama, Atelopus petersi, Atelopus bomolochos, Pristimantis pycnodermis, Pristimantis baryecuus* Reptile: *Riama balneator* Bird: *Hapalopsittaca pyrrhops, Phlogophilus hemileucurus, Buthraupis wetmorei, Doliornis remseni* Mammal: *Tapirus pinchaque*
Parque Nacional Sumaco-Napo Galeras	IBA	Amphibian: *Hyloscirtus staufferorum, Hyloxalus fuliginosus, Nymphargus wileyi, Osornophryne sumacoensis, Pristimantis ernesti* Bird: *Touit stictopterus, Galbula pastazae, Dysithamnus occidentalis*
Pilaló	AZE	Amphibian: *Pristimantis thymalopsoides*
Reserva Ecológica Antisana	IBA	Amphibian: *Hyloxalus maculosus, Osornophryne antisana, Pristimantis ignicolor, Pristimantis rubicundus* Bird: *Touit stictopterus*
Reserva Ecológica Cayambe-Coca	IBA	Amphibian: *Centrolene pipilatum, Nymphargus anomalus, Ranitomeya abdita, Osornophryne puruanta, Pristimantis acerus, Pristimantis lividus, Pristimantis cremnobates, Hyalinobatrachium pellucidum, Nymphargus megacheirus,* Bird: *Touit stictopterus, Doliornis remseni, Buthraupis wetmorei*
Reserva Ecológica Cotacachi-Cayapas	IBA	Amphibian: *Atelopus coynei, Hyloxalus toachi, Pristimantis degener, Pristimantis tenebrionis, Agalychnis litodryas* Reptile: *Riama oculata* Bird: *Eriocnemis nigrivestis, Odontophorus melanonotus* Mammal: *Mindomys hammondi, Lonchophylla orcesi*
Reserva Ecológica Los Illinizas y alrededores	IBA	Amphibian: *Centrolene gemmatum, Hyloscirtus ptychodactylus, Pristimantis thymalopsoides, Pristimantis actites, Pristimantis nyctophylax* Reptile: *Riama oculata* Bird: *Odontophorus melanonotus, Glaucidium nubicola, Grallaria gigantea, Grallaria alleni*
Reserva Tapichalaca	IBA / AZE	Bird: *Grallaria ridgelyi*
Río Caoní	IBA	Amphibian: *Strabomantis helonotus* Bird: *Dacnis berlepschi*
Rio Toachi-Chiriboga	IBA / AZE	Amphibian: *Pristimantis dissimulatus, Pristimantis eugeniae, Pristimantis sobetes* Bird: *Pachyramphus spodiurus, Ognorhynchus icterotis*
Sumaco Napo Galeras and surrounding areas	AZE	Amphibian: *Hyloscirtus staufferorum, Hyloxalus fuliginosus, Nymphargus wileyi, Osornophryne sumacoensis, Pristimantis ernesti*
Territorio Etnico Awá y alrededores	IBA	Amphibian: *Andinophryne colomai, Pristimantis colomai, Pristimantis degener* Bird: *Ara ambiguus, Penelope ortoni, Vireo masteri, Neomorphus radiolosus*
Valle de Guayllabamba	IBA	Bird: *Eriocnemis godini*
Peru		
7 km East of Chachapoyas	AZE	Amphibian: *Atelopus epikeisthos*
Abra Pardo de Miguel	AZE	Amphibian: *Telmatobius necopinus*
Abra Patricia - Alto Mayo	IBA / AZE	Plant: *Passiflora amazónica*, *Centropogon varicus, Siphocampylus plegmatocaulis* Amphibian: *Pristimantis atrabracus, Pristimantis cuneirostris, Pristimantis infraguttatus* Bird: *Grallaricula ochraceifrons, Xenoglaux loweryi, Heliangelus regalis*
Carpish	AZE	Amphibian: *Gastrotheca zeugocystis, Phrynopus kauneorum, Rhinella chavin, Telmatobius punctatus*

KBA name	Origin[1]	Trigger species[2]
Carpish	IBA	Plant: *Fuchsia ceracea, Inga augustii, Sanchezia dasia, Sanchezia ferreyrae* Amphibian: *Gastrotheca zeugocystis, Phrynopus kauneorum, Rhinella chavin, Telmatobius punctatus, Phrynopus dagmarae, Phrynopus horstpauli* Bird: *Buthraupis aureodorsalis, Chaetocercus bombus, Doliornis sclateri, Hemispingus rufosuperciliaris* Mammal: *Marmosops juninensis*
Cordillera de Colán	IBA	Plant: *Passiflora amazonica, Nasa colanii* Amphibian: *Centrolene lemniscatum, Centrolene muelleri, Hyloxalus aeruginosus, Hyloxalus mittermeieri, Pristimantis cuneirostris, Pristimantis infraguttatus, ristimantis karcharias* Bird: *Grallaricula ochraceifrons, Poecilotriccus luluae* Mammal: *Callicebus oenanthe, Oreonax flavicauda*
Cordillera de Colán	AZE	Amphibian: *Telmatobius colanensis*
Cordillera Yanachaga	IBA	Plant: *Passiflora weigendii, Brunellia weberbaueri, Aphelandra tillettii, Bunchosia bonplandiana, Fuchsia coriacifolia* Amphibian: *Pristimantis lucasi, Rhinella yanachaga, Ameerega planipaleae, Phrynopus bracki* Reptile: Stenocercus torquatus Bird: *Nothocercus nigrocapillus*
Cosñipata Valley	AZE	Amphibian: *Bryophryne cophites, Pristimantis cosnipatae, Psychrophrynella usurpator, Hyloscirtus antoniiochoai* Mammal: *Isothrix barbarabrownae*
Kosnipata Carabaya	new	Plant: *Passiflora cuzcoensis* Amphibian: *Hyloscirtus antoniiochoai, Atelopus erythropus, Bryophryne cophites* Mammal: *Isothrix barbarabrownae*
Los Chilchos to Leymebamba Trail	AZE	Amphibian: *Atelopus pyrodactylus*
Moyobamba	IBA	Bird: *Herpsilochmus parkeri, Ara militaris, Zimmerius villarejoi*
Ocobamba-Cordillera de Vilcanota (candidate)	new	Amphibian: *Bryophryne bustamantei* Bird: *Cinclodes aricomae, Leptasthenura xenothorax*
Playa Pampa	IBA	Amphibian: *Nymphargus mixomaculatus* Bird: *Nothocercus nigrocapillus*
Rio Utcubamba	IBA / AZE	Bird: *Loddigesia mirabilis, Leptosittaca branickii, Picumnus steindachneri, Thripophaga berlepschi*
San Jose de Lourdes	IBA	Bird: *Heliangelus regalis, Patagioenas oenops*
Santuario Histórico Machu Picchu	IBA	Plant: *Passiflora quadriflora* Bird: *Leptasthenura xenothorax*
Venezuela		
Monumento Natural Pico Codazzi	IBA	Amphibian: *Prostherapis dunni, Allobates bromelicola, Gastrotheca ovifera, Hyalinobatrachium guairarepanense* Bird: *Grallaria excelsa*
Parque Nacional Henri Pittier	IBA / AZE	Amphibian: *Mannophryne neblina, Allobates bromelicola, Gastrotheca ovifera, Hyalinobatrachium guairarepanense* Reptile: *Liophis williamsi, Anadia marmorata* Bird: *Rallus wetmorei, Carduelis cucullata*
Parque Nacional Macarao	IBA	Reptile: *Liophis williamsi, Anadia marmorata* Bird: *Pauxi pauxi*

[1] KBA origin provided to prevent confusion when IBAs and AZE sites have the same name but different boundaries.
[2] English names are provided in Appendix 4.

Appendix 6. Protected Areas of the Tropical Andes Hotspot

Sources: Chilean Ministerio del Ambiente, EcoCiencia, Fundación Amigos de la Naturaleza (FAN), Fundación Natura, Geomáticos Consultores, ProYungas.

Country	Protected Area	Designation	Area (ha)	Percent of area in Tropical Andes Hotspot
Argentina	Bosque Modelo Tucumán	international	162,840	80%
Argentina	Monumento Natural Laguna de los Pozuelos	national	12,768	100%
Argentina	Monumento Natural Provincial Laguna de Leandro	national	56	100%
Argentina	Monumento Natural Quebrada de Humahuaca	World Heritage Site	472,126	75%
Argentina	Parque Botánico Barón Carlos María Schuel	national	14	100%
Argentina	Parque Nacional Baritú	national	56,024	100%
Argentina	Parque Nacional Calilegua	national	66,272	100%
Argentina	Parque Nacional Campo De Los Alisos	national	13,964	100%
Argentina	Parque Nacional El Rey	national	37,722	100%
Argentina	Parque Nacional Los Cardones	national	59,377	19%
Argentina	Parque Nacional y Reserva Nacional Campo Pizarro	national	19,211	88%
Argentina	Parque Provincial Aconquija	national	433	100%
Argentina	Parque Provincial Cumbres Calchaquíes	national	71,509	100%
Argentina	Parque Provincial Laguna Pintascayo	national	13,915	100%
Argentina	Parque Provincial Lagunas de Vilama	Ramsar	138,783	100%
Argentina	Parque Provincial Los Ñuñorcos	national	11,677	100%
Argentina	Parque Provincial Potrero de Yala	national	1,494	100%
Argentina	Parque Sierra De San Javier	national	12,712	54%
Argentina	Reserva Alto Andina de la Chinchilla	national	331,885	100%
Argentina	Reserva de Fauna y Flora Olaroz Cauchari	national	185,046	100%
Argentina	Reserva de la Biósfera de las Yungas	international	1,213,772	99%
Argentina	Reserva de la Biósfera Laguna Blanca	Ramsar	614,796	32%
Argentina	Reserva de la Biósfera Laguna de los Pozuelos	Ramsar	472,236	100%
Argentina	Reserva de la Biósfera San Guillermo	international	848,616	24%
Argentina	Reserva Forestal La Florida	national	15,647	96%
Argentina	Reserva Nacional El Nogalar de los Toldos	national	2,918	100%
Argentina	Reserva Natural Laguna Brava	national	377,892	30%
Argentina	Reserva Natural Las Lancitas	national	8,744	100%
Argentina	Reserva Natural Municipal Rio Xibi - Xibi	national	30	100%
Argentina	Reserva Natural y Cultural de Barrancas	national	1,481	100%
Argentina	Reserva Provincial Finca Las Costas	national	7,740	44%
Argentina	Reserva Provincial Campo Pizarro	national	12,670	100%
Argentina	Reserva Provincial de Acambuco	national	28,248	100%

Country	Protected Area	Designation	Area (ha)	Percent of area in Tropical Andes Hotspot
Argentina	Reserva Provincial La Angostura	national	1,039	100%
Argentina	Reserva Provincial Los Andes	national	1,353,473	95%
Argentina	Reserva Provincial Los Sosa	national	1,121	100%
Argentina	Reserva Provincial Lote 5 B Carabajal	national	847	100%
Argentina	Reserva Provincial Quebrada Del Portugues	national	16,322	100%
Argentina	Reserva Provincial Santa Ana	national	17,571	81%
Argentina	Reserva Serranias de Zapla	national	33,405	25%
Bolivia	Area de proteccion del Pino del Cerro	subnational	4,237	100%
Bolivia	Area Natural de Manejo Integrado (ANMI) Apolobamba	national	437,238	100%
Bolivia	Area Natural de Manejo Integrado (ANMI) El Palmar	national	54,745	100%
Bolivia	Area Natural de Manejo Integrado Rio Grande Valles Crucenos	subnational	673,222	63%
Bolivia	Lago Titicaca (Sector Boliviano)	RAMSAR	382,806	100%
Bolivia	Parque Nacional Carrasco	national	630,679	100%
Bolivia	Parque Nacional Llica	subnational	67,733	100%
Bolivia	Parque Nacional Mirikiri	subnational	691	100%
Bolivia	Parque Nacional Sajama	national	91,762	100%
Bolivia	Parque Nacional Toro Toro	national	15,270	100%
Bolivia	Parque Nacional Tunari	national	299,833	100%
Bolivia	Parque Nacional Tuni Condoriri	subnational	8,346	100%
Bolivia	Parque Nacional y ANMI Amboró	national	546,124	96%
Bolivia	Parque Nacional y ANMI Cotapata	national	56,665	100%
Bolivia	Parque Nacional y ANMI Iñao	national	239,510	91%
Bolivia	Parque Nacional y ANMI Madidi	national	1,741,846	88%
Bolivia	Parque Nacional y ANMI Serranía del Aguarague	national	97,673	14%
Bolivia	Parque Nacional y Territorio Indígena Isiboro Sécure	national	1,131,022	39%
Bolivia	Parque Nacional Yura	subnational	88,019	100%
Bolivia	Refugio de Vida Silvestre Huancaroma	subnational	33,601	100%
Bolivia	Reserva Biológica Cordillera de Sama	national	94,602	100%
Bolivia	Reserva de Biósfera y TCO Pilón Lajas	national	369,709	99%
Bolivia	Reserva Fiscal Cerro Tapilla	subnational	962	100%
Bolivia	Reserva Nacional de Fauna Andina Eduardo Avaroa	national	619,700	100%
Bolivia	Reserva Nacional de Fauna Andina Incacasani Altamachi	subnational	20,743	100%
Bolivia	Reserva Nacional de Flora y Fauna Tariquia	national	222,465	100%
Bolivia	Santuario de Vida Silvestre Cavernas del Repechón	national	209	100%
Bolivia	Santuario de Vida Silvestre Flavio Machicado Viscarra	subnational	61	100%
Chile	Monumento Natural Salar de Surire	Ramsar	15,860	100%
Chile	Parque Nacional Lauca	national	124,781	100%

Country	Protected Area	Designation	Area (ha)	Percent of area in Tropical Andes Hotspot
Chile	Parque Nacional Llullaillaco	national	241,282	100%
Chile	Parque Nacional Salar de Huasco	Ramsar	100,353	100%
Chile	Parque Nacional Volcan Isluga	national	150,637	90%
Colombia	Altamira	subnational/ unknown	15	100%
Colombia	Alto De Paula	private conservation area	126	100%
Colombia	Área de Recreación Alto Del Rey	subnational	158	100%
Colombia	Área de Recreación Cerro Gobia	subnational	315	100%
Colombia	Área De Reserva Forestal Protectora Cuenca Alta Del Río Nembí	national	2,681	100%
Colombia	Área Natural Única Los Estoraques	national	775	100%
Colombia	Arrayanal	private conservation area	1,453	100%
Colombia	Arrayanales	private conservation area	176	100%
Colombia	Arroyito	subnational/ unknown	5	100%
Colombia	Aves De El Paujil	private conservation area	1,669	100%
Colombia	Ayllu Del Rio	private conservation area	5	100%
Colombia	Baldivia	private conservation area	58	100%
Colombia	Belen	private conservation area	11	100%
Colombia	Belencito	private conservation area	4	100%
Colombia	Bella Vista	subnational/ unknown	2	100%
Colombia	Bellavista	subnational/ unknown	492	100%
Colombia	Betania	private conservation area	84	100%
Colombia	Bosques De Chipaque	private conservation area	130	100%
Colombia	Bosques Y Montes Del Soche Ii	private conservation area	55	100%
Colombia	Buenos Aires	subnational/ unknown	149	100%
Colombia	Buenos Aires El Porvenir	subnational/ unknown	135	100%
Colombia	Carpatos	private conservation area	590	100%
Colombia	Celula Verde	private conservation area	11	100%
Colombia	Cerro De Juaica	private conservation area	1,015	100%
Colombia	Cerrobravo	subnational/ unknown	387	100%
Colombia	Chicaque	private conservation area	334	100%

Country	Protected Area	Designation	Area (ha)	Percent of area in Tropical Andes Hotspot
Colombia	Cordoba 1	private conservation area	1	100%
Colombia	Cuchilla De San Antonio	subnational/ unknown	15,253	100%
Colombia	Cusagui	subnational/ unknown	15	100%
Colombia	De Las Aves Colibrí Del Sol	subnational/ unknown	1,569	100%
Colombia	De Las Mirabilis Swarovscki	private conservation area	173	100%
Colombia	Dinaboy	subnational/ unknown	258	100%
Colombia	Distrito de Conservación de Suelos Barbas Bremen	subnational	4,994	100%
Colombia	Distrito de Conservación de Suelos Campoalegre	subnational	24,247	100%
Colombia	Distrito de Conservación de Suelos Tibaitatá	subnational	664	100%
Colombia	Distrito De Manejo Integrado Cuchilla Jardin Tamesis	subnational	32,628	100%
Colombia	Distrito De Manejo Integrado De Los Recursos Naturales Renovables Canon Del Rio Alicante	subnational	7,446	100%
Colombia	Distrito De Manejo Integrado Nubes Trocha Capota	subnational	4,882	100%
Colombia	Distrito De Manejo Integrado Páramo Rabanal	subnational	7,696	100%
Colombia	Distrito De Manejo Integrado Regional Cuenca Alta Del Rio Quindio Salento	subnational	33,234	100%
Colombia	Distrito De Manejo Integrado Regional Enclave Subxerofitico De Atuncela	subnational	1,140	100%
Colombia	Distrito De Manejo Integrado Regional Lago De Sochagota	subnational	9,607	100%
Colombia	Distrito De Manejo Integrado Rios Barroso Y San Juan	subnational	3,548	100%
Colombia	Distrito De Manejo Integrado Sistema De Paramos Y Bosques Altoandinos Del Noroccidente Medio Antioqueno	subnational	50,481	100%
Colombia	Distrito Regional de Manejo integrado Nacimiento Quebradas Tiestos Chorrera Y Hoya Fria	subnational	748	100%
Colombia	Distrito Regional de Manejo Integrado Agualinda	subnational	377	100%
Colombia	Distrito Regional de Manejo Integrado Charca De Guarinocito	subnational	176	100%
Colombia	Distrito Regional de Manejo Integrado Cuchilla De Bellavista	subnational	1,506	100%
Colombia	Distrito Regional de Manejo Integrado Cuchilla Del San Juan	subnational	12,890	100%
Colombia	Distrito Regional de Manejo Integrado De Bucaramanga	subnational	5,778	100%
Colombia	Distrito Regional de Manejo Integrado El Chuscal	subnational	2,583	100%
Colombia	Distrito Regional de Manejo Integrado Guasimo	subnational	1,662	100%
Colombia	Distrito Regional de Manejo Integrado La Cristalina La Mesa	subnational	2,606	100%

Country	Protected Area	Designation	Area (ha)	Percent of area in Tropical Andes Hotspot
Colombia	Distrito Regional de Manejo Integrado Laguna De San Diego	subnational	882	100%
Colombia	Distrito Regional de Manejo integrado Paramo De Guargua Y Laguna Verde	subnational	30,682	100%
Colombia	Distrito Regional de Manejo Integrado Serrania De Los Yariguies	subnational	496,243	96%
Colombia	Dos Quebradas	subnational/ unknown	6	100%
Colombia	Dulima La Estrella	subnational/ unknown	243	100%
Colombia	El Jardin	private conservation area	1	100%
Colombia	El Oasis	private conservation area	30	100%
Colombia	El Alto	private conservation area	3	100%
Colombia	El Cabuyo	private conservation area	2	100%
Colombia	El Caimo	private conservation area	12	100%
Colombia	El Carmen	private conservation area	4	100%
Colombia	El Cedral	subnational/ unknown	65	100%
Colombia	El Cedro	subnational/ unknown	15	100%
Colombia	El Cerro Arrayan	private conservation area	18	100%
Colombia	El Comino	private conservation area	19	100%
Colombia	El Contento Las Palmas	subnational/ unknown	26	100%
Colombia	El Derrumbo	private conservation area	2	100%
Colombia	El Guayabo	private conservation area	15	100%
Colombia	El Hato	private conservation area	6	100%
Colombia	El Horadado De San Alejo	private conservation area	36	100%
Colombia	El Jazmin	private conservation area	6	100%
Colombia	El Mantel El Retiro La Casacada	subnational/ unknown	384	100%
Colombia	El Manzano	private conservation area	15	100%
Colombia	El Mirador 3	private conservation area	6	100%
Colombia	El Nahir La Esmeralda Olla Grande	subnational/ unknown	12	100%
Colombia	El Naranjal	private conservation area	32	100%
Colombia	El Pajonal	subnational/ unknown	370	100%

Country	Protected Area	Designation	Area (ha)	Percent of area in Tropical Andes Hotspot
Colombia	El Palmichal	private conservation area	14	100%
Colombia	El Pedregal	private conservation area	13	100%
Colombia	El Pensil	private conservation area	55	100%
Colombia	El Placer	private conservation area	15	100%
Colombia	El Plan	private conservation area	11	100%
Colombia	El Porvenir	private conservation area	5	100%
Colombia	El Raizal La Gironda	subnational/ unknown	128	100%
Colombia	El Recuerdo	private conservation area	16	100%
Colombia	El Refugio De Techotiva	private conservation area	5	100%
Colombia	El Retiro	private conservation area	149	100%
Colombia	El Retorno	private conservation area	7	100%
Colombia	El Rincón	private conservation area	23	100%
Colombia	El Roble	subnational/ unknown	29	100%
Colombia	El Romeral	private conservation area	176	100%
Colombia	El Silencio	subnational/ unknown	45	100%
Colombia	El Silencio Del Oso	subnational/ unknown	21	100%
Colombia	El Tauro	subnational/ unknown	116	100%
Colombia	El Toro	subnational/ unknown	122	100%
Colombia	El Trebol	subnational/ unknown	111	100%
Colombia	Embalse El Peñón Y Cuenca Alta Del Río Guatapé	subnational/ unknown	21,723	100%
Colombia	Futuras Generaciones De Sibate I Y Ii	private conservation area	163	100%
Colombia	Guacas Rosario	subnational/ unknown	1,143	100%
Colombia	Guayacanes Del Llano Verde	subnational/ unknown	27	100%
Colombia	Inti Rai	private conservation area	27	100%
Colombia	Irlanda	private conservation area	34	100%
Colombia	Islandia	subnational/ unknown	7	100%
Colombia	Juaitoque	subnational/ unknown	462	100%

Country	Protected Area	Designation	Area (ha)	Percent of area in Tropical Andes Hotspot
Colombia	La Angostura	subnational/ unknown	10	100%
Colombia	La Aurora	subnational/ unknown	11	100%
Colombia	La Cantera Y La Laguna	private conservation area	58	100%
Colombia	La Ceja	private conservation area	30	100%
Colombia	La Cima	subnational/ unknown	271	100%
Colombia	La Concepción	private conservation area	7	100%
Colombia	La Copa San José	subnational/ unknown	138	100%
Colombia	La Cuchilla 1	subnational/ unknown	4	100%
Colombia	La Cuchilla 2	subnational/ unknown	3	100%
Colombia	La Esmeralda	subnational/ unknown	143	100%
Colombia	La Esperanza	subnational/ unknown	282	100%
Colombia	La Fernanda	private conservation area	15	100%
Colombia	La Fortaleza	subnational/ unknown	3	100%
Colombia	La Gaviota	subnational/ unknown	13	100%
Colombia	La Gloria	subnational/ unknown	51	100%
Colombia	La Gruta	private conservation area	132	100%
Colombia	La Laguna	subnational/ unknown	3	100%
Colombia	La Montaña Y La Palma	subnational/ unknown	26	100%
Colombia	La Paila	subnational/ unknown	172	100%
Colombia	La Palma	private conservation area	30	100%
Colombia	La Parcela 2	private conservation area	29	100%
Colombia	La Parcela 9	private conservation area	8	100%
Colombia	La Pedregoza	subnational/ unknown	266	100%
Colombia	La Pequeñita	private conservation area	1	100%
Colombia	La Pradera	subnational/ unknown	664	100%
Colombia	La Primavera	private conservation area	14	100%
Colombia	La Reserva	subnational/ unknown	309	100%

Country	Protected Area	Designation	Area (ha)	Percent of area in Tropical Andes Hotspot
Colombia	La Rinconada Lote 15 Bremen Lote 16	subnational/ unknown	535	100%
Colombia	La Santísima Trinidad	subnational/ unknown	940	100%
Colombia	La Suiza	subnational/ unknown	60	100%
Colombia	La Vega	subnational/ unknown	33	100%
Colombia	La Ventura	subnational/ unknown	9	100%
Colombia	Las Aves El Dorado	subnational/ unknown	754	100%
Colombia	Las Bromelias	private conservation area	10	100%
Colombia	Las Damas	subnational/ unknown	143	100%
Colombia	Las Golondrinas	subnational/ unknown	37	100%
Colombia	Las Guacamayas	subnational/ unknown	11	100%
Colombia	Las Mercedes	private conservation area	8	100%
Colombia	Las Mirlas	subnational/ unknown	216	100%
Colombia	Las Veraneras	subnational/ unknown	9	100%
Colombia	Los Chagualos	subnational/ unknown	79	100%
Colombia	Los Laureles	private conservation area	21	100%
Colombia	Los Pinos	subnational/ unknown	18	100%
Colombia	Lote 5	subnational/ unknown	7	100%
Colombia	Mana	private conservation area	3	100%
Colombia	Manantiales	subnational/ unknown	4	100%
Colombia	Marruecos	subnational/ unknown	113	100%
Colombia	Mirador El Consuelo	private conservation area	8	100%
Colombia	Monte Redondo	private conservation area	9	100%
Colombia	Montecito	subnational/ unknown	5	100%
Colombia	Montevivo	subnational/ unknown	85	100%
Colombia	Moralba	subnational/ unknown	329	100%
Colombia	Motilonal	private conservation area	12	100%
Colombia	Nacimiento Del Rio Bogotá	subnational/ unknown	1,583	100%

Country	Protected Area	Designation	Area (ha)	Percent of area in Tropical Andes Hotspot
Colombia	Nacimiento Quebradas Hondas Y Calderitas	subnational/ unknown	562	100%
Colombia	Palmira	private conservation area	23	100%
Colombia	Pantanillo	private conservation area	3	100%
Colombia	Parcela 13 Las Brisas	private conservation area	6	100%
Colombia	Parcela 16 El Arrayan	private conservation area	18	100%
Colombia	Parcela 2 La Palma	private conservation area	10	100%
Colombia	Parcela 8 Campo Bello	private conservation area	13	100%
Colombia	Parque Ecológico Los Andes	private conservation area	256	100%
Colombia	Parque Nacional Natural Alto Fragua Indi Wasi	national	82,576	95%
Colombia	Parque Nacional Natural Catatumbo Barí	national	200,019	58%
Colombia	Parque Nacional Natural Chingaza	national	89,439	100%
Colombia	Parque Nacional Natural Complejo Volcánico Doña Juana Cascabel	national	71,351	100%
Colombia	Parque Nacional Natural Cordillera De Los Picachos	national	320,228	72%
Colombia	Parque Nacional Natural Cueva De Los Guácharos	national	8,093	100%
Colombia	Parque Nacional Natural El Cocuy	national	363,478	100%
Colombia	Parque Nacional Natural Farallones De Cali	national	231,444	63%
Colombia	Parque Nacional Natural Las Hermosas	national	140,654	100%
Colombia	Parque Nacional Natural Las Orquídeas	national	34,427	100%
Colombia	Parque Nacional Natural Los Nevados	national	71,235	100%
Colombia	Parque Nacional Natural Munchique	national	52,041	98%
Colombia	Parque Nacional Natural Nevado Del Huila	national	184,772	100%
Colombia	Parque Nacional Natural Paramillo	national	641,647	82%
Colombia	Parque Nacional Natural Pisba	national	42,979	100%
Colombia	Parque Nacional Natural Puracé	national	98,825	100%
Colombia	Parque Nacional Natural Selva De Florencia	national	11,627	100%
Colombia	Parque Nacional Natural Serranía De Los Churumbelos Auka Wasi	national	105,435	96%
Colombia	Parque Nacional Natural Serranía De Los Yariguíes	national	70,656	100%
Colombia	Parque Nacional Natural Sierra De La Macarena	national	671,088	37%
Colombia	Parque Nacional Natural Sierra Nevada De Santa Marta	national	519,038	84%
Colombia	Parque Nacional Natural Sumapaz	national	252,256	100%
Colombia	Parque Nacional Natural Tamá	national	61,724	100%
Colombia	Parque Nacional Natural Tatamá	national	49,570	100%
Colombia	Parque Natural Lago De Tota	private	3	100%

Country	Protected Area	Designation	Area (ha)	Percent of area in Tropical Andes Hotspot
		conservation area		
Colombia	Parque Natural Regional Bosques Andinos Húmedos El Rasgón	subnational	7,875	100%
Colombia	Parque Natural Regional Cerro La Judía	subnational	4,207	100%
Colombia	Parque Natural Regional Del Nima	subnational	3,403	100%
Colombia	Parque Natural Regional Del Vinculo	subnational	94	100%
Colombia	Parque Natural Regional La Siberia	subnational	137	100%
Colombia	Parque Natural Regional La Tablona	subnational	1,924	100%
Colombia	Parque Natural Regional La Tatacoa	subnational	40,083	100%
Colombia	Parque Natural Regional Paramo Del Duende	subnational	16,444	100%
Colombia	Parque Natural Regional Rabanal En El Municipio De Samacá	subnational	5,255	100%
Colombia	Parque Natural Regional Santa Emilia	subnational	611	100%
Colombia	Parque Natural Regional Serranía De Las Quinchas	subnational	41,309	100%
Colombia	Parque Natural Regional Serranía De Minas	subnational	31,945	100%
Colombia	Parque Natural Regional Verdum	subnational	662	100%
Colombia	Patio Bonito	subnational/ unknown	19	100%
Colombia	Paz Verde	private conservation area	16	100%
Colombia	Penas Blancas	subnational/ unknown	87	100%
Colombia	Piedra Sentada	private conservation area	2	100%
Colombia	Porvenir Las Violetas	subnational/ unknown	85	100%
Colombia	Primavera 6	subnational/ unknown	35	100%
Colombia	Pueblo Viejo	private conservation area	593	100%
Colombia	Puerta Dorada	private conservation area	15	100%
Colombia	Pullitopamba	private conservation area	22	100%
Colombia	Punchiná	subnational/ unknown	4,337	100%
Colombia	Quebrada Guadualito Y El Negrito	national	1,383	100%
Colombia	Quebrada Honda Y Caños Parrado Y Buque	national	1,648	43%
Colombia	Quebrada Paramillo Y Queceros	subnational/ unknown	287	100%
Colombia	Quebradas El Peñón Y San Juan	national	736	100%
Colombia	Recuerdo	subnational/ unknown	29	100%
Colombia	Reserva Forestal Protectora Ubicada En Los Montes De Oca	subnational	10,993	100%
Colombia	Reserva Forestal Protectora Bosque Oriental De Bogotá	national	15,033	100%

Country	Protected Area	Designation	Area (ha)	Percent of area in Tropical Andes Hotspot
Colombia	Reserva Forestal Protectora Buena Vista Y Los Manatiales	subnational	165	100%
Colombia	Reserva Forestal Protectora Cerro Quinini	national	2,199	100%
Colombia	Reserva Forestal Protectora Cerros Pionono Y Las águilas	subnational	703	100%
Colombia	Reserva Forestal Protectora Colombia	subnational	324	100%
Colombia	Reserva Forestal Protectora Conception	subnational	154	100%
Colombia	Reserva Forestal Protectora Cuchilla De Sucuncuca	national	2,052	100%
Colombia	Reserva Forestal Protectora Cuchilla El Choque	subnational	2,591	100%
Colombia	Reserva Forestal Protectora Cuchilla Peñas Blancas	national	1,853	100%
Colombia	Reserva Forestal Protectora Cuenca Alta Del Río Cali	national	7,674	100%
Colombia	Reserva Forestal Protectora Cuenca Alta Del Río Cravo Sur	national	5,543	100%
Colombia	Reserva Forestal Protectora Cuenca Alta Del Río Jirocasaca	national	379	100%
Colombia	Reserva Forestal Protectora Cuenca Alta Del Río Mocoa	national	32,488	100%
Colombia	Reserva Forestal Protectora Cuenca Alta Del Río Satocá	national	4,946	75%
Colombia	Reserva Forestal Protectora Cuenca Del Río Las Ceibas	national	14,967	100%
Colombia	Reserva Forestal Protectora Cuenca Del Río Tame	national	1,944	100%
Colombia	Reserva Forestal Protectora Cuenca Hidrográfica De La Quebrada La Tablona	national	3,104	100%
Colombia	Reserva Forestal Protectora El Cerro Dapa Carisucio	national	1,586	100%
Colombia	Reserva Forestal Protectora El Desierto Patio Bonito	subnational	75	100%
Colombia	Reserva Forestal Protectora El Diamante	subnational	752	100%
Colombia	Reserva Forestal Protectora El Hortigal	national	249	100%
Colombia	Reserva Forestal Protectora El Malmo	national	59	100%
Colombia	Reserva Forestal Protectora El Popal	subnational	268	100%
Colombia	Reserva Forestal Protectora El Porvenir El Guadual	subnational	4	100%
Colombia	Reserva Forestal Protectora El Robledal	subnational	465	100%
Colombia	Reserva Forestal Protectora Frontino	national	35,751	100%
Colombia	Reserva Forestal Protectora Hoya Hernando	subnational	165	100%
Colombia	Reserva Forestal Protectora La Bolsa	national	3,105	100%
Colombia	Reserva Forestal Protectora La Cuchilla Del Minero	national	11,819	100%
Colombia	Reserva Forestal Protectora La Linda	subnational	229	100%
Colombia	Reserva Forestal Protectora La Marina	subnational	194	100%
Colombia	Reserva Forestal Protectora La Planada	national	4,519	100%
Colombia	Reserva Forestal Protectora La Sabana De Las Delicias	subnational	183	100%

Country	Protected Area	Designation	Area (ha)	Percent of area in Tropical Andes Hotspot
Colombia	Reserva Forestal Protectora La Vitilia La Palma	subnational	132	100%
Colombia	Reserva Forestal Protectora Laguna La Cocha Cerro Patascoy	national	53,936	100%
Colombia	Reserva Forestal Protectora Manantial De Cañaverales	subnational	1,286	100%
Colombia	Reserva Forestal Protectora Mistela	national	107	100%
Colombia	Reserva Forestal Protectora Nacional Rio Morales	national	2,049	100%
Colombia	Reserva Forestal Protectora Pantano Redondo Y Nacimiento Rio Susagua	subnational	1,560	100%
Colombia	Reserva Forestal Protectora Páramo De Guargua Y Laguna Verde	subnational	16,876	100%
Colombia	Reserva Forestal Protectora Páramo De Guerrero	subnational	2,211	100%
Colombia	Reserva Forestal Protectora Páramo De Urrao	national	35,294	100%
Colombia	Reserva Forestal Protectora Páramo El Atravesado	national	3,625	100%
Colombia	Reserva Forestal Protectora Páramo Grande	national	8,167	100%
Colombia	Reserva Forestal Protectora Parque El Higuerón	national	25	100%
Colombia	Reserva Forestal Protectora Planalto	subnational	107	100%
Colombia	Reserva Forestal Protectora Pozo Azul	subnational	122	100%
Colombia	Reserva Forestal Protectora Quebrada La Nona	national	698	100%
Colombia	Reserva Forestal Protectora Quebrada La Tenería	national	966	100%
Colombia	Reserva Forestal Protectora Regional Cerro Bravo	subnational	1,044	100%
Colombia	Reserva Forestal Protectora Regional De Bitaco	subnational	219	100%
Colombia	Reserva Forestal Protectora Regional Jerico Libano Y Sebastopol	subnational	373	100%
Colombia	Reserva Forestal Protectora Regional La Albania	subnational	249	100%
Colombia	Reserva Forestal Protectora Regional La Albania Y La Esmeralda	subnational	185	100%
Colombia	Reserva Forestal Protectora Río Algodonal	national	9,717	100%
Colombia	Reserva Forestal Protectora Río Anchicaya	national	154,914	52%
Colombia	Reserva Forestal Protectora Río Bobo Y Buesaquillo	national	5,074	100%
Colombia	Reserva Forestal Protectora Río Guabas	national	18,163	100%
Colombia	Reserva Forestal Protectora Río Guadalajara	national	9,688	100%
Colombia	Reserva Forestal Protectora Río Meléndez	national	1,985	100%
Colombia	Reserva Forestal Protectora Río Nare	national	10,360	100%
Colombia	Reserva Forestal Protectora Río Rucio	national	687	100%
Colombia	Reserva Forestal Protectora Río San Francisco	national	3,310	100%
Colombia	Reserva Forestal Protectora Río Tejo	national	2,956	100%
Colombia	Reserva Forestal Protectora Ríos Blanco Y Negro	national	14,508	100%
Colombia	Reserva Forestal Protectora Ríos Chorreras Y Concepción	national	5,076	100%

Country	Protected Area	Designation	Area (ha)	Percent of area in Tropical Andes Hotspot
Colombia	Reserva Forestal Protectora Sabinas	subnational	213	100%
Colombia	Reserva Forestal Protectora Serrania Pinche	subnational	8,003	100%
Colombia	Reserva Forestal Protectora Sierra El Peligro	national	1,857	100%
Colombia	Reserva Forestal Protectora Tarcara	subnational	844	100%
Colombia	Reserva Forestal Protectora Tolima	subnational	265	100%
Colombia	Reserva Hidrica El Soche San Rafael	private conservation area	1	100%
Colombia	Reserva Miravalle	subnational/ unknown	77	100%
Colombia	Reserva Natural Para La Conservación De Los Ecosistemas Andinos	subnational/ unknown	2	100%
Colombia	Río Blanco Y Quebrada Olivares	national	5,754	100%
Colombia	Rio Subachoque Y Pantano De Arce	private conservation area	4,851	100%
Colombia	Rogitama Biodiversidad	private conservation area	33	100%
Colombia	San Antonio	subnational/ unknown	55	100%
Colombia	San Cayetano	subnational/ unknown	27	100%
Colombia	San Ignacio	private conservation area	4	100%
Colombia	San Lorenzo	subnational/ unknown	5,397	100%
Colombia	San Pedro Y El Recuerdo	private conservation area	45	100%
Colombia	San Rafael	subnational/ unknown	37	100%
Colombia	Santa Ines	private conservation area	6	100%
Colombia	Santa Maria De Las Lagunas	subnational/ unknown	91	100%
Colombia	Santa Marta	private conservation area	18	100%
Colombia	Santa Teresa	private conservation area	32	100%
Colombia	Santuario de Flora Plantas Medicinales Orito Ingi Ande	national	10,986	100%
Colombia	Santuario de Flora y Fauna Galeras	national	8,929	100%
Colombia	Santuario de Flora y Fauna Guanentá Alto Río Fonce	national	12,018	100%
Colombia	Santuario de Flora y Fauna Iguaque	national	8,064	100%
Colombia	Santuario de Flora y Fauna Isla De La Corota	national	17	100%
Colombia	Santuario de Flora y Fauna Otún Quimbaya	national	524	100%
Colombia	Serranía De Perijá	subnational/ unknown	30,728	100%
Colombia	Serrania La Vieja	subnational/ unknown	609	100%
Colombia	Sisavita	subnational/ unknown	14,726	100%

Country	Protected Area	Designation	Area (ha)	Percent of area in Tropical Andes Hotspot
Colombia	Soledad Las Nubes	subnational/ unknown	99	100%
Colombia	Soledad Potosi	subnational/ unknown	175	100%
Colombia	Sueños Verdes	private conservation area	20	100%
Colombia	Tierra Blanca No 4	subnational/ unknown	8	100%
Colombia	Tulcan Los Canelos 2	subnational/ unknown	1,402	100%
Colombia	Uno	subnational/ unknown	95	100%
Colombia	Villa Del Monte	subnational/ unknown	3	100%
Colombia	Villa Luz	private conservation area	22	100%
Colombia	Villa Margarita	private conservation area	22	100%
Colombia	Villa Maria	private conservation area	80	100%
Colombia	Villamaría Y La Marina	subnational/ unknown	13	100%
Colombia	Villarica	private conservation area	123	100%
Ecuador	Area Nacional de Recreación El Boliche	national	414	100%
Ecuador	Parque Nacional Cajas	national/Ramsar	30,138	100%
Ecuador	Parque Nacional Cayambe Coca	national	433,413	99%
Ecuador	Parque Nacional Cotopaxi	national	34,002	100%
Ecuador	Parque Nacional LLanganates	national/Ramsar	231,510	100%
Ecuador	Parque Nacional Podocarpus	national/Ramsar	139,579	100%
Ecuador	Parque Nacional Sangay	national	519,431	100%
Ecuador	Parque Nacional Sumaco Napo Galeras	national	213,617	94%
Ecuador	Parque Nacional Yacuri	national	43,257	100%
Ecuador	Refugio de Vida Silvestre El Zarza	national	3,688	100%
Ecuador	Refugio de Vida Silvestre Pasochoa	national	668	100%
Ecuador	Reserva Biológica El Cóndor	national	8,034	100%
Ecuador	Reserva Biológica El Quimi	national	9,223	100%
Ecuador	Reserva Ecológica Antisana	national	127,152	100%
Ecuador	Reserva Ecológica Cofán Bermejo	national	59,271	47%
Ecuador	Reserva Ecológica Cotacachi Cayapas	national	249,541	98%
Ecuador	Reserva Ecológica El Angel	national	17,155	100%
Ecuador	Reserva Ecológica ILinizas	national	163,043	100%
Ecuador	Reserva Faunística Chimborazo	national	55,414	100%
Ecuador	Reserva Geobotánica Pululahua	national	3,771	100%
Peru	Abra Málaga	private	953	100%

Country	Protected Area	Designation	Area (ha)	Percent of area in Tropical Andes Hotspot
		conservation area		
Peru	Abra Málaga Thastayoc - Royal Cinclodes	private conservation area	66	100%
Peru	Abra Patricia-Alto Nieva	private conservation area	1,402	100%
Peru	Área de Conservación Regional Angostura-Faical	subnational	8,923	35%
Peru	Área de Conservación Regional Bosque de Puya Raymondi - Titankayocc	subnational	5,830	100%
Peru	Área de Conservación Regional Choquequirao	subnational	96,530	100%
Peru	Área de Conservación Regional Cordillera Escalera	subnational	148,549	79%
Peru	Área de Conservación Regional Vilacota Maure	subnational	113,393	89%
Peru	Bosque de Protección Alto Mayo	national	176,083	100%
Peru	Bosque de Protección Pagaibamba	national	1,992	100%
Peru	Bosque de Protección Pui Pui	national	51,464	100%
Peru	Bosque de Protección San Matias San Carlos	national	141,771	93%
Peru	Bosque Nublado	private conservation area	3,126	100%
Peru	Bosques Nublados de Udima Sector Centro	national	73	100%
Peru	Bosques Nublados de Udima Sector Norte	national	2,220	93%
Peru	Bosques Nublados de Udima Sector Sur	national	9,656	100%
Peru	Choquechaca	private conservation area	1,931	100%
Peru	Coto de Caza Sunchubamba	national	59,396	100%
Peru	Hatun Queuña - Quishuarani Ccollana	private conservation area	218	100%
Peru	Huamanmarca-Ochuro-Tumpullo	private conservation area	14,379	53%
Peru	Huayllapa	private conservation area	20,050	100%
Peru	Huiquilla	private conservation area	1,122	100%
Peru	Jirishanca	private conservation area	11,495	100%
Peru	Juningue	private conservation area	39	100%
Peru	Lagunas de Huacarpay	Ramsar	3,373	100%
Peru	Llamac	private conservation area	6,450	100%
Peru	Mantanay	private conservation area	340	100%
Peru	Pacllon	private conservation area	14,062	70%
Peru	Pampacorral	private conservation area	713	100%
Peru	Parque Nacional Bahuaja Sonene	national	1,016,489	26%
Peru	Parque Nacional Cerros de Amotape	national	153,428	30%
Peru	Parque Nacional Cordillera Azul	national	1,316,592	78%

Country	Protected Area	Designation	Area (ha)	Percent of area in Tropical Andes Hotspot
Peru	Parque Nacional Cutervo	national	8,102	100%
Peru	Parque Nacional del Manu	national	1,589,517	37%
Peru	Parque Nacional Huascarán	national	325,360	93%
Peru	Parque Nacional Ichigkat Muja - Cordillera del Cóndor	national	90,016	83%
Peru	Parque Nacional Otishi	national	287,564	100%
Peru	Parque Nacional Río Abiseo	national	264,680	100%
Peru	Parque Nacional Tingo María	national	4,579	100%
Peru	Parque Nacional Yanachaga-Chemillén	national	108,025	98%
Peru	Qosqoccahuarina	private conservation area	1,699	100%
Peru	Ramis y Arapa (Lago Titicaca, sector Peruano)	Ramsar	444,218	100%
Peru	Reserva Comunal Amarakaeri	national	375,472	39%
Peru	Reserva Comunal Ampay	national	3,577	100%
Peru	Reserva Comunal Ashaninka	national	173,422	100%
Peru	Reserva Comunal Chayu Naín	national	23,447	100%
Peru	Reserva Comunal El Sira	national	588,463	82%
Peru	Reserva Comunal Machiguenga	national	205,541	100%
Peru	Reserva Comunal Tuntanain	national	95,755	62%
Peru	Reserva Comunal Yanesha	national	31,766	84%
Peru	Reserva Nacional de Calipuy	national	4,335	90%
Peru	Reserva Nacional de Salinas y Aguada Blanca	national	337,737	81%
Peru	Reserva Nacional de Tumbes	national	19,513	78%
Peru	Reserva Nacional del Titicaca	national	6,502	100%
Peru	Reserva Nacional Junín	national/Ramsar	49,714	100%
Peru	Reserva Nacional Pampa Galeras Barbara D´ Achille	national	7,326	80%
Peru	Reserva Nacional Titicaca	national	26,507	100%
Peru	Reserva Paisajística Cerro Khapia	national	16,775	100%
Peru	Reserva Paisajística Nor Yauyos-Cochas	national	207,668	74%
Peru	Reserva Paisajística Sub Cuenca del Cotahuasi	national	451,539	52%
Peru	Sagrada Familia	private conservation area	119	100%
Peru	San Antonio	private conservation area	352	100%
Peru	Santuario Histórico Chacamarca	national	2,293	100%
Peru	Santuario Histórico De la Pampa de Ayacucho	national	279	100%
Peru	Santuario Histórico Machupicchu	national	34,690	100%
Peru	Santuario Nacional Cordillera de Colán	national	38,926	100%
Peru	Santuario Nacional de Huayllay	national	6,399	100%
Peru	Santuario Nacional Megantoni	national	201,987	100%

Country	Protected Area	Designation	Area (ha)	Percent of area in Tropical Andes Hotspot
Peru	Santuario Nacional Pampa Hermosa	national	10,918	100%
Peru	Santuario Nacional Tabaconas Namballe	national	32,058	100%
Peru	Sele Tecse-Lares Ayllu	private conservation area	906	100%
Peru	Tambo Ilusion	private conservation area	14	100%
Peru	Tilacancha	private conservation area	6,694	100%
Peru	Uchumiri	private conservation area	9,410	64%
Peru	Zona Reservada Chancaybaños	national	2,601	100%
Peru	Zona Reservada Cordillera Huayhuash	national	64,205	100%
Peru	Zona Reservada Río Nieva	national	36,091	100%
Venezuela	Monumento Natural Abra de Río Frío	national	1,940	54%
Venezuela	Monumento Natural Chorreras Las González	national	156	100%
Venezuela	Monumento Natural Cueva Alfredo Jahn	national	65	100%
Venezuela	Monumento Natural Cueva del Guácharo	national	1,343	100%
Venezuela	Monumento Natural Laguna de Urao	national	55	100%
Venezuela	Monumento Natural Loma de León	national	9,666	35%
Venezuela	Monumento Natural Meseta La Galeta	national	69	100%
Venezuela	Monumento Natural Morros de Macaira	national	101	100%
Venezuela	Monumento Natural Pico Codazzi	national	14,523	98%
Venezuela	Monumento Natural Teta de Niquitao-Guirigay (Sector A)	national	21,388	100%
Venezuela	Monumento Natural Teta de Niquitao-Guirigay (Sector B)	national	12,066	100%
Venezuela	Parque Nacional Chorro El Indio	national	20,090	100%
Venezuela	Parque Nacional Dinira	national	57,254	100%
Venezuela	Parque Nacional El Avila	national	103,113	79%
Venezuela	Parque Nacional El Guácharo	national	19,618	75%
Venezuela	Parque Nacional El Guácharo (Decreto de Ampliación)	national	60,694	96%
Venezuela	Parque Nacional El Guache	national	20,191	100%
Venezuela	Parque Nacional El Tamá	national	179,309	99%
Venezuela	Parque Nacional G. Cruz Carrillo en Guaramacal	national	26,173	100%
Venezuela	Parque Nacional Guatopo	national	151,933	61%
Venezuela	Parque Nacional Henri Pittier	national	137,066	73%
Venezuela	Parque Nacional Juan Pablo Peñalosa en los Páramos Batallón y la Negra	national	115,397	100%
Venezuela	Parque Nacional Macarao	national	18,573	100%
Venezuela	Parque Nacional Península de Paria	national	45,124	76%

Country	Protected Area	Designation	Area (ha)	Percent of area in Tropical Andes Hotspot
Venezuela	Parque Nacional Perijá	national	366,813	82%
Venezuela	Parque Nacional San Esteban	national	51,428	38%
Venezuela	Parque Nacional Sierra La Culata	national	248,702	100%
Venezuela	Parque Nacional Sierra Nevada	national	339,401	100%
Venezuela	Parque Nacional Tapo-Caparo	national	244,858	61%
Venezuela	Parque Nacional Terepaima	national	21,366	71%
Venezuela	Parque Nacional Tirgua General Manuel Manrique	national	114,050	12%
Venezuela	Parque Nacional Yacambú	national	31,303	100%
Venezuela	Parque Nacional Yurubí	national	30,269	91%

Appendix 7. Population Statistics by Department/Province/State/Region and Approximation for the Tropical Andes Hotspot

Sources: INDEC-Argentina 2010, INE-Bolivia 2012, INE-Chile 2012, DANE-Colombia 2005, INEC-Ecuador 2010, INEI-Peru 2007 and INE-Venezuela 2011.

Country (Census Year)	Department/Province/ State/Region	Percent Area (%) in Hotspot	Population	Population Density (people/km^2)	Population Adjusted for Hotspot Area
Argentina (2010)	Jujuy	88	673,307	13	592,510
	Salta	42	1,214,441	8	510,065
	Tucumán	44	1,448,188	64	637,203
	Average Population Density			28	
	Population in Hotspot				1,739,778
Bolivia (2012)	Chuquisaca	82	576,153	11	472,445
	Cochabamba	79	1,758,143	32	1,388,933
	La Paz	75	2,706,351	20	2,029,763
	Oruro	100	494,178	9	494,178
	Potosí	100	823,517	7	823,517
	Tarija	55	482,198	13	265,209
	Average Population Density			15	
	Population in Hotspot				5,474,045
Chile (2012)	Antofagasta	40	588,100	5	235,240
	Average Population Density			5	
	Population in Hotspot				235,240
Colombia (2005, projection for 2013)	Antioquia	70	6,299,886	84	4,409,920
	Boyacá	94	1,272,844	47	1,196,473
	Caldas	93	984,128	107	915,239
	Cauca	80	1,354,744	43	1,083,795
	Cundinamarca	93	2,598,245	100	2,416,368
	Distrito Esp. Bogotá	100	9,374,366	526	9,374,366
	Huila	100	1,126,314	51	1,126,314
	Nariño	59	1,701,840	49	1,004,086
	Norte de Santander	67	1,332,335	50	892,664
	Quindío	100	558,934	298	558,934
	Risaralda	99	941,283	198	931,870
	Santander	71	2,340,988	64	1,662,101
	Tolima	100	1,400,203	54	1,400,203
	Valle del Cauca	76	4,520,166	182	3,435,326
	Average Population Density			132	
	Population in Hotspot				30,407,659
Ecuador (2010)	Azuay	96	712,127	76	683,642
	Bolívar	97	183,641	44	178,132
	Cañar	87	225,184	49	195,910
	Carchi	98	164,524	40	161,234
	Chimborazo	100	458,581	72	458,581
	Cotopaxi	92	409,205	52	376,469
	El Oro	53	600,659	51	318,349
	Imbabura	98	398,244	77	390,279
	Loja	93	448,966	37	417,538
	Morona-Santiago	72	147,940	4	106,517
	Pichincha	84	2,576,287	144	2,164,081
	Tungurahua	100	504,583	158	504,583
	Zamora-Chinchipe	100	91,376	10	91,376
	Average Population Density			63	
	Population in Hotspot				6,046,691
Peru (2007,	Amazonas	70	417,508	10	292,256
	Ancash	45	1,129,391	30	508,226

Country (Census Year)	Department/Province/ State/Region	Percent Area (%) in Hotspot	Population	Population Density (people/km^2)	Population Adjusted for Hotspot Area
projection for 2012)	Apurimac	99	451,881	19	447,362
	Ayacucho	63	666,029	14	419,598
	Cajamarca	87	1,513,892	42	1,317,086
	Cusco	89	1,292,175	16	1,150,036
	Huancavelica	74	483,580	21	357,849
	Huánuco	81	840,984	21	681,197
	Junín	93	1,321,407	28	1,228,909
	La Libertad	43	1,791,659	63	770,413
	Pasco	79	297,591	11	235,097
	Puno	90	1,377,122	19	1,239,410
	San Martín	76	806,452	14	612,904
	Average Population Density			24	
	Population in Hotspot				9,260,343
Venezuela (2011)	Distrito Capital	54	1,943,901	530	1,049,707
	Merida	86	828,592	53	712,589
	Miranda	46	2,675,165	107	1,230,576
	Táchira	74	1,168,908	71	864,992
	Trujillo	66	686,367	42	453,002
	Average Population Density			161	
	Population in Hotspot				4,310,866
Approximate Total Population in the Tropical Andes Hotspot					**57,474,622**

Appendix 7. KBA and Corridor Prioritization Methods

This appendix describes the methodology used to prioritize KBAs and corridors for CEPF investment, and provides the prioritization ranking results for the KBAs that were not prioritized.

Prioritization steps

1. *Select the KBAs with high biodiversity value* (above 0.4 irreplaceability score and with validated occurrences of threatened species; see Chapter 4). Lower ranking KBAs were not considered in the prioritization exercise.

2. *Eliminate overlapping KBAs*. When two high biodiversity value KBAs overlap by more than 50%, the larger KBA was selected for the analysis and the smaller one eliminated. This step eliminated 11 KBAs from the analysis.

3. *Score each KBA according to prioritization factors*. Each KBA was evaluated relative to other KBAs in the hotspot using the following values: 1=low, 2=fair, 3=high and 4=very high. Scores of all factors were summed to determine an overall prioritization score for each KBA. The biological priority factor was given double weight in the scoring for overall prioritization.

Biological Priority. Determined directly from the relative biodiversity value (*i.e.*, the irreplaceability score; Chapter 4) using the quartile ranges of the set of all KBA relative biodiversity values greater than 0.40 threshold.

1=low: relative biodiversity value from 0.40-0.44
2=fair: relative biodiversity value from 0.45-0.50
3=high: relative biodiversity value from 0.51-0.58
4=very high: relative biodiversity value from 0.59-0.75

Degree of Threat. Determined directly from the vulnerability scores derived from the landscape condition model as described in Chapter 9. The thresholds between scoring categories were determined using the quartile ranges of the set of all KBA vulnerability scores.

1=low: vulnerability from 0.00-0.03
2=fair: vulnerability from 0.04-0.08
3=high: vulnerability from 0.09-0.18
4=very high: vulnerability from 0.19-0.92

Funding Need. Determined directly from corridor-level funding information for the 5-year period from 2009-2013 (Table 10.12) and adjusted by the area of KBAs in each corridor.

1=low: conservation investment in corridor where KBA occurs was more than $1.12/KBA ha.
2=fair: conservation investment in corridor where KBA occurs was between $0.04-1.12/KBA ha.

3=high: conservation investment in corridor where KBA occurs was between $0-0.04/KBA ha.

4=very high: there was no recorded conservation investment in corridor where KBA occurs.

Management Need. Determined by the existing management capacity in the KBA. A high need is where there no existing management structure or one with poor management capacity. Management capacity information was generated in stakeholder consultation workshops and includes consideration of i) the existence of approved management plans, ii) sufficient park management staff, iii) adequate management infrastructure, iv) mechanisms for community engagement in management decision-making, and v) access to sustainable funding. KBAs were considered to have "High" management capacity if they have at least two of the management capacity components; "Medium" management capacity of they have one of the management capacity components, and "Low" management capacity of they do not have any of the management capacity components.

1=low need: greater than 80% of the KBA has strong legal protection and the existing management unit(s) has/have high management capacity.

2=fair need: at least 50% of the KBA has strong legal protection and the existing management unit(s) has/have medium management capacity.

3=high need: less than 50% of the KBA has strong legal protection and the existing management unit(s) has/have low-medium management capacity.

4=very high need: no part of the KBA has legal protection, or if it does, the capacity of the management unit is low.

Civil Society Capacity Needs. Derived from the institutional capacity data presented in section 7.6 for civil society organizations that work within the corridor, emphasizing local organizations.

1=low need: more than one civil society organization has very good capacity.

2=fair need: at least three civil society organizations have good capacity, and/or one civil society organization has very good capacity.

3=high need: at least one civil society organizations has good capacity and the remaining civil society organizations have limited capacity.

4=very high need: no more than four civil society organizations exist and none have more than limited capacity.

Operational Feasibility. Based on obstacles such as ongoing insecurity or legal prohibitions at the corridor level that are likely to undermine success.

1=low: substantial security concerns and the existence of a legal structure that frustrates international conservation investment aimed at civil society organizations.

2=fair: substantial security concerns and/or the existence of a legal structure that creates some significant obstacles to international conservation investment aimed at civil society organizations.

3=high: minor security concerns and/or the existence of a legal structure that creates minor obstacles to international conservation investment aimed at civil society organizations.
4=very high: virtually no security concerns and a national legal framework that facilitates international conservation investment aimed at civil society organizations.

Opportunity for Landscape-scale Conservation. Accounts for the conservation needs of the large landscapes present in the Tropical Andes, was scored directly from KBA area figures. The thresholds between scoring categories were determined using the quartile ranges of the areas of all KBAs included in the analysis.

1=low: area less than 8,176 ha.
2=fair: area greater than 8,176 and less than 29,441 ha.
3=high: area greater than 29,441 and less than 119,312 ha.
4=very high: area greater than 119,312 ha.

Alignment with National Priorities. Most countries in the hotspot have defined national areas that are priorities for biodiversity conservation, such as in a National Biodiversity Strategic Action Plan. This factor gives greater priority to KBAs that overlap substantially with these national priorities.

1=low: no overlap with national priority.
2=fair: 1-49% overlap with national priority.
3=high: 50-80% overlap with national priority.
4=very high: >80% overlap with national priority.

4. *Data validation.* The scored socio-political factors for the KBAs, grouped in corridors, were validated and improved by the respective national expert, and also at the regional consultation workshop (see Chapter 2).

5. *Eliminate KBAs where CEPF investment is not warranted*. KBAs scoring 1 for feasibility or 1 for management need were eliminated from consideration due to the difficulty of working in them or because of a lack of need for CEPF-funded management improvements.

6. *Define priority KBAs*. KBAs with a prioritization score of 19 or higher were considered for priority status. Because of CEPF's focus on landscape scale conservation, KBAs scoring 19 or over that are located in corridors without other similarly high-scoring KBAs were not considered as priorities.

7. *Define priority corridors and clusters*. Priority corridors were defined as those with a significant land area (greater than 75,000 ha) of priority KBAs that provide an economy of scale to justify working at the corridor level. The prioritized KBAs allowed the definition of five priority corridors or clusters of corridors. Corridors with several KBAs and/or a significant land area of priority KBAs were considered priorities. In one case (for the Paraguas-Munchique, Cotacachi-Awa, and Northwestern Pichincha corridors), adjacent corridors were grouped into a cluster of corridors to enhance the ease of managing investments. The northern portion of the

Northeastern Peru corridor contained three priority KBAs whereas the the remainder of the corridor didn't contain any, so just the northern portion is considered a priority for investment. Finally, the Alrededores de Amaluza KBA, occurring at the southern end of the Cotopaxi-Amaluza corridor, was the only prioritized KBA in that corridor and will therefore be managed together with the Condor-Kutuku-Palanda corridor.

Appendix 8. Priority Factor Scores for High Biodiversity Value KBAs

CEPF Priority Investment KBAs

Name	CEPF Code	Country	Biological priority	Degree of threat	Need for more cons. funding	Management need	Opport. to strengthen CSO capacity	Operational Feasibility	Opport for landscape cons.	Coincidence with national priorities	Overall score
Bosque de Polylepis de Madidi	BOL5	Bolivia	2[1]	2	2	3	3	3	3	3	23[2]
Bosque de Polylepis de Sanja Pampa	BOL7	Bolivia	1	4	3	3	3	3	1	1	20
Bosque de Polylepis de Taquesi	BOL8	Bolivia	1	1	3	3	3	3	4	1	20
Coroico	BOL12	Bolivia	1	1	3	4	3	3	2	1	19
Cotapata	BOL13	Bolivia	3	2	3	3	3	3	4	2	26
Yungas Inferiores de Pilón Lajas	BOL37	Bolivia	1	4	3	3	4	3	4	1	24
Alto de Oso	COL4	Colombia	2	4	2	4	2	3	1	1	21
Bosque de San Antonio/Km 18	COL7	Colombia	4	4	2	2	2	3	1	1	23
Munchique Sur	COL54	Colombia	4	2	2	2	2	3	2	1	22
Parque Nacional Natural Munchique	COL67	Colombia	3	2	2	2	2	3	3	1	21
Parque Natural Regional Páramo del Duende	COL75	Colombia	3	1	2	2	2	3	3	4	23
Región del Alto Calima	COL80	Colombia	3	3	2	3	2	3	2	1	22
Reserva Natural La Planada	COL88	Colombia	4	3	1	1	2	2	1	1	19
Reserva Natural Río Ñambí	COL91	Colombia	3	4	1	1	2	2	2	1	19
Serranía de los Paraguas	COL106	Colombia	3	4	2	2	2	3	4	1	24
Serranía del Pinche	COL109	Colombia	3	4	2	2	2	3	1	1	21
Sierra Nevada de Santa Marta National Natural Park and surrounding areas	COL110	Colombia	1	2	4	3	2	3	4	2	22
Abra de Zamora	ECU2	Ecuador	3	4	2	2	2	3	1	3	23
Alrededores de Amaluza	ECU6	Ecuador	3	2	4	4	2	3	3	2	26
Bosque Protector Alto Nangaritza	ECU9	Ecuador	1	3	2	2	2	3	3	3	20
Cordillera del Cóndor	ECU27	Ecuador	1	3	2	4	2	3	4	3	23

Name	CEPF Code	Country	Biological priority	Degree of threat	Need for more cons. funding	Management need	Opport. to strengthen CSO capacity	Operational Feasibility	Opport for landscape cons.	Coincidence with national priorities	Overall score
Corredor Awacachi	ECU28	Ecuador	3	2	1	4	2	2	2	2	21
Intag-Toisán	ECU34	Ecuador	2	4	1	2	2	3	3	2	21
Los Bancos-Milpe	ECU41	Ecuador	4	3	2	3	1	3	2	2	24
Maquipucuna-Río Guayllabamba	ECU43	Ecuador	4	4	2	2	1	3	2	3	25
Mindo and western foothills of Volcan Pichincha	ECU44	Ecuador	4	4	2	2	1	3	3	3	26
Río Caoní	ECU54	Ecuador	3	4	2	4	1	3	2	1	23
Reserva Ecológica Cotacachi-Cayapas	ECU61	Ecuador	3	2	1	2	2	3	4	2	22
Territorio Étnico Awá y alrededores	ECU70	Ecuador	2	3	1	4	3	3	4	3	25
7 km East of Chachapoyas	PER4	Peru	3	1	1	3	1	3	1	4	20
Abra Pardo de Miguel	PER6	Peru	4	2	1	3	1	3	1	4	23
Cordillera de Colán	PER29	Peru	4	1	1	2	1	3	4	1	21
Rio Utcubamba	PER84	Peru	4	3	1	3	1	3	3	1	23
San Jose de Lourdes	PER86	Peru	2	3	2	4	2	3	1	1	20

Not CEPF Investment Priorities

Name	CEPF Code	Country	Biological priority	Degree of threat	Need for more cons. funding	Management need	Opport. to strengthen CSO capacity	Operational Feasibility	Opport. for landscape cons.	Coincidence with national priorities	Overall score[1]
Alto Carrasco and surrounding areas	BOL2	Bolivia	1	2	3	4	2	1	4	3	--
Cristal Mayu y Alrededores	BOL14	Bolivia	3	3	3	4	2	1	3	2	--
Alto de Pisones	COL5	Colombia	3	4	2	2	3	3	1	1	22
Alto Quindío	COL6	Colombia	1	3	4	1	1	3	1	4	--

Name	CEPF Code	Country	Biological priority	Degree of threat	Need for more cons. funding	Management need	Opport. to strengthen CSO capacity	Operational Feasibility	Opport. for landscape cons.	Coincidence with national priorities	Overall score[1]
Bosques del Oriente de Risaralda	COL10	Colombia	2	2	4	2	1	3	2	2	20
Cañón del Río Barbas y Bremen	COL14	Colombia	2	4	4	2	1	3	2	1	21
Coromoro	COL27	Colombia	2	4	1	4	2	3	2	1	21
Enclave Seco del Río Dagua	COL36	Colombia	4	4	2	1	2	3	2	4	26
Finca la Betulia Reserva la Patasola	COL37	Colombia	2	1	4	1	1	3	1	1	--
Páramo de Sonsón	COL57	Colombia	1	4	4	3	3	3	3	4	26
Páramos del Sur de Antioquia	COL59	Colombia	1	2	4	3	3	3	2	4	23
Parque Nacional Natural Cueva de los Guácharos	COL62	Colombia	2	2	2	1	4	1	2	2	--
Parque Nacional Natural Farallones de Cali	COL65	Colombia	3	2	2	1	2	3	4	2	--
Reserva Biológica Cachalú	COL81	Colombia	1	2	1	1	2	3	1	1	--
Reserva Natural El Pangán	COL86	Colombia	4	2	1	1	2	2	1	1	--
Selva de Florencia	COL101	Colombia	4	2	4	1	3	3	3	1	--
Serranía de las Minas	COL103	Colombia	1	4	1	2	1	3	3	1	17
Serranía de los Churumbelos	COL105	Colombia	1	2	1	1	1	3	4	1	--
Valle de Sibundoy	COL114	Colombia	3	3	2	2	4	1	2	1	--
Valle de Sibundoy & Laguna de la Cocha (expanded)	COL115	Colombia	3	2	2	2	4	1	4	1	--
1 km west of Loja	ECU1	Ecuador	1	1	1	1	2	3	1	3	14
Agua Rica	ECU4	Ecuador	4	4	4	4	2	3	1	1	27
Antisana Ecological Reserve and surrounding areas	ECU7	Ecuador	1	1	1	1	2	3	3	1	--
Bosque Protector Los Cedros	ECU14	Ecuador	4	3	1	1	2	3	2	3	23
Cayambe-Coca Ecological Reserve and surrounding areas	ECU22	Ecuador	1	3	1	1	2	3	4	1	--
Cordillera de Huacamayos-San Isidro-Sierra Azul	ECU25	Ecuador	4	1	1	1	2	3	3	1	--
Corredor Ecológico Llanganates-Sangay	ECU29	Ecuador	3	2	4	2	2	3	3	2	24
La Bonita-Santa Bárbara	ECU35	Ecuador	1	3	2	4	4	1	2	1	--

Name	CEPF Code	Country	Biological priority	Degree of threat	Need for more cons. funding	Management need	Opport. to strengthen CSO capacity	Operational Feasibility	Opport. for landscape cons.	Coincidence with national priorities	Overall score[1]
Los Illinizas Ecological Reserve and surrounding areas	ECU42	Ecuador	1	3	2	1	1	3	4	2	--
Parque Nacional Podocarpus	ECU50	Ecuador	2	1	2	2	2	3	4	2	20
Parque Nacional Sangay	ECU51	Ecuador	1	2	4	2	2	3	4	1	20
Parque Nacional Sumaco-Napo Galeras	ECU52	Ecuador	4	3	1	2	2	3	4	1	24
Pilaló	ECU53	Ecuador	2	4	2	3	1	3	1	2	20
Reserva Tapichalaca	ECU64	Ecuador	1	3	2	1	2	3	1	3	--
Rio Toachi-Chiriboga	ECU66	Ecuador	4	3	2	1	1	3	3	3	24
Valle de Guayllabamba	ECU74	Ecuador	2	4	2	3	1	3	2	3	22
Abra Patricia - Alto Mayo	PER7	Peru	3	1	1	1	1	3	4	4	--
Carpish	PER18	Peru	2	3	1	4	2	3	4	4	25
Cordillera Yanachaga	PER34	Peru	1	1	1	2	2	3	3	1	15
Cosñipata Valley	PER35	Peru	1	1	2	3	1	4	3	3	19
Kosnipata Carabaya	PER44	Peru	3	2	2	3	1	4	3	4	25
Los Chilchos to Leymebamba Trail	PER58	Peru	1	1	1	4	1	3	1	4	17
Moyobamba	PER65	Peru	1	3	1	2	1	3	3	1	16
Playa Pampa	PER73	Peru	3	1	1	4	2	3	1	4	22
Santuario Histórico Machu Picchu	PER90	Peru	1	1	2	1	1	4	3	2	--
Monumento Natural Pico Codazzi	VEN3	Venezuela	3	1	4	3	2	1	2	ND	--
Parque Nacional Henri Pittier	VEN9	Venezuela	3	2	4	4	2	1	4	ND	--
Parque Nacional Macarao	VEN10	Venezuela	3	1	4	3	2	1	2	ND	--

[1] Sum of all factor scores, with biodiversity value counted double. KBAs scoring 1 for management need or operational feasibility did not receive an overall score.