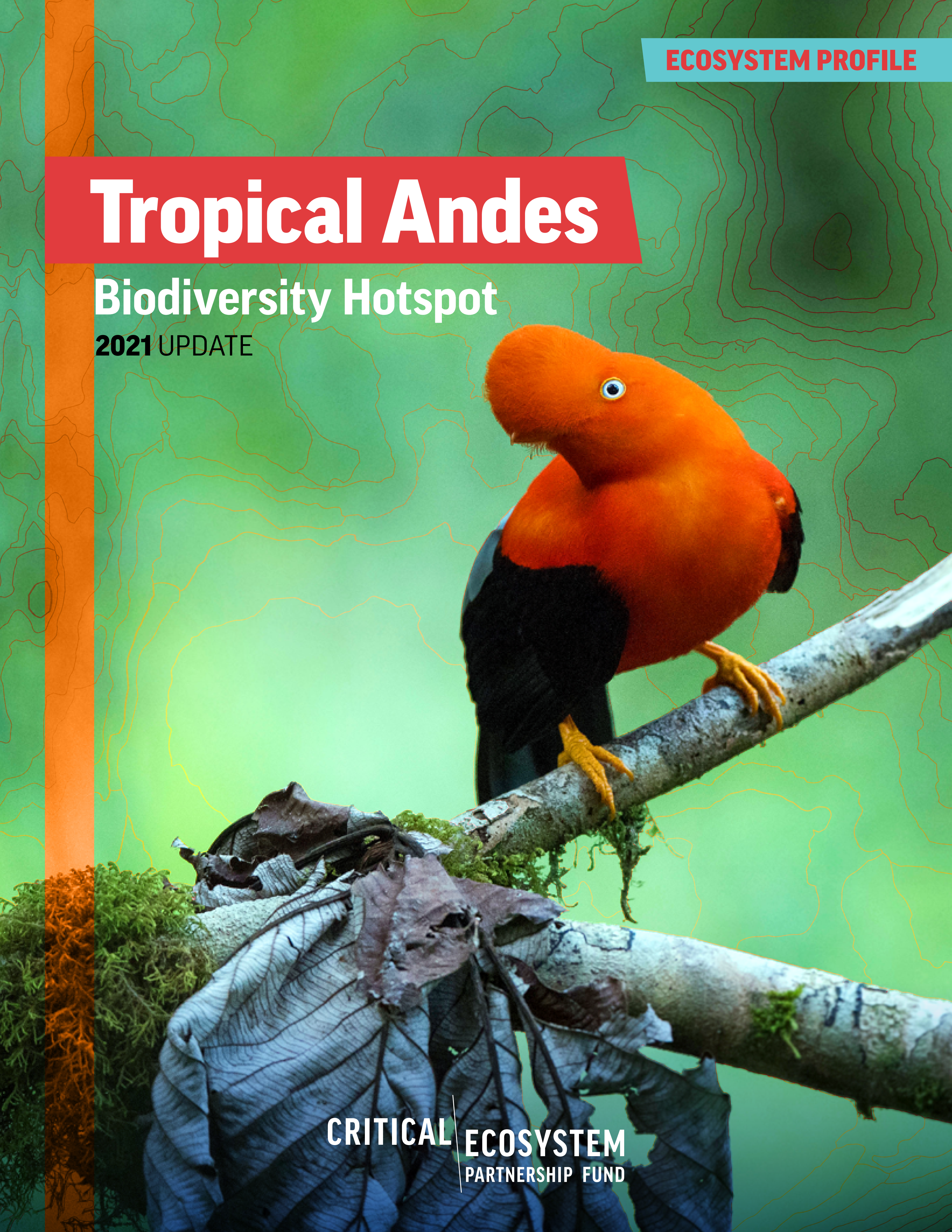
ECOSYSTEM PROFILE

Tropical Andes

Biodiversity Hotspot

2021 UPDATE



CRITICAL ECOSYSTEM PARTNERSHIP FUND

CRITICAL ECOSYSTEM PARTNERSHIP FUND

Ecosystem Profile

BIODIVERSITY HOTSPOT OF THE TROPICAL ANDES

2021 Update

FINAL VERSION

June 2021

Prepared by:
Pronaturaleza – Fundación Peruana por la Conservación de la Naturaleza

In association with:
Panthera Colombia (Colombia), Practical Action (Bolivia and Peru),
Fundación Ecológica Arcoiris (Ecuador), and
BirdLife International (UK)

Under the supervision and co-authorship of:
Michele Zador, Critical Ecosystem Partnership Fund

Ecosystem profiling team:

Rafael Antelo
Rocío Bardales
Judith Borja
Mónica Cuba
David Díaz
Mirella Gallardo
Sandra Isola
Maricruz Jaramillo
Arturo Jimenez
Melina Laporte
Alfredo López
Shirley Pazos
Elizabeth Peña
Fernando Regal
Daniel Toro
Antonio Tovar
Julieta Vargas
Rocío Vásquez
Claudia Vega

Advisory Committee:
Marc Dourojeanni
Lilian Painter
Alberto Galán

With the support of the
Tropical Andes Regional Implementation Team (RIT):
Jorge Mariaca
Odile Sánchez
Martha Silva
Paola Zavala

With supported from the following experts:

ARGENTINA
Malizia, Sebastián
Paolasso, Pablo

BOLIVIA
Altamirano, Cesar
Aparicio, James
Arteaga, Luis
Arze, Marcelo
Barrera, Soraya
Bloomfield, Henry
Flores, Percy
Forno, Eduardo
Herzog, Sebastián
La Torre, Maritza
Pazos, Shirley
Loayza, Óscar
López, Ramiro
Marca, Sandra
Medina, Jorge Luis
Meneses, Rosa Isela
Roca, Claudia
Romay, Ebelio
Salinas, Manuel
San Cristóbal, Mónica
Siles, Lizette
Soria, Rodrigo W.
Soria-Auza, Rodrigo
Terán, Marcos
Valdéz, Adolfo
Valenzuela, Marcos
Vargas, Edwin
Vilela, Martín
Villanueva, Gabriela
Villarroel, Miguel

CHILE
Casale, Jean
Chávez, Cesar
Contreras, Juan Mauricio
Vega, Carolina
Yáñez, José

COLOMBIA
Arana, Ana Elvira
Arias, Jony
Bermeo, Diana
Bisbicus, Olivio
Bolívar-García Wilmar
Borrero, Andrea
Búch, Svanhild
Cabrera, Wilson
Cáceres, Andrea
Cadena, Carlos Fernando
Caicedo, Juan Carlos
Caicedo, Miguel
Camargo, Pedro
Cantillo, Guillermo
Carvajal, Consuelo
Castro, Álvaro
Cepeda, Belisario
Chávez, Adolfo
Chiquito, Santiago
Cifuentes, Yanira
Cortés, Alex
Cortés, Mariana
Cuellar, Andrés
De la Zerda, Sussy
Duarte, Sebastián
Echeverri, David
Elfi, María
Flores, Christian
Franco, César
Gallego Beatriz
Galvis, Marcela
García, Stefanía
Gensini, Giraldo
Giraldo, Paula
Giraldo, Jorge
Gómez, Natalia
Granobles, Jonathan
Guaramato, Fabiana
Gutiérrez, Victoria
Hernández, Olga
Hernández, Raúl
Hinestroza, Lina
Hirche, Armin
Laina, Alejandra
Lara, Sara
Lentijo, Gloria
Matallana, Clara
Mosquera, Claudia
Mosquera, Mario
Nadachowski, Erika
Orjuela, Mónica
Ortega, Luis
Oyola, Fabián
Palacio, Rubén Darío
Paredes, Gisela
Paz, Karen
Paz, Liliana
Piedrahita, Mario
Pineda, Ruth
Proaño-Castro, Carolina
Quintero, Andrés
Ramírez, Diego
Range, Felipe
Rivera, Mauricio
Rodríguez, José
Saavedra, Carlos
Salinas, Nelson
Sánchez, Gustavo
Sánchez, Claudia
Santamaria, Marcela

Serrano, Germán
Sierra, Santiago
Silva, Liliana
Valencia, Diana
Vela, Liliana
Velásquez, Jorge
Vieira, Sebastián
Zamudio, Jeisson

ECUADOR
Andino, Marcela
Añazco, Mario
Arcos, Inty
Arnal, Hugo
Armijos, Diego
Burbano, Adriana
Camacho Jaime
Collaguazo Germán
DeCoux Josef
Domínguez Diana
Durán, María Belén
Galeas, Raul
Greene, Natalia
Granizo, Tarsicio
Guarderas, María Dolores
Guzmán Henrry
Hofstede Robert
Jaime, Camacho
Jaramillo, Alicia
Jaramillo, Nelson
Jiménez, Marcos
Jintiach, Juan Carlos
Josse, Carmen
Katan, Tuntiak
Krohnke, Brian
Laporta, Denis
Lescano, Max
Levy, Santiago
Levy, Elisa
Lloret, Pablo
Martínez, Christian
Miagua, Marcelo
Moreira, Henry
Nastacuaz, Olindo
Obando, Eduardo
Ordóñez, Luis
Ordóñez-Delgado, Leonardo
Paredes, Telma
Peña, Jaime
Peralvo, Manuel
Proaño, Carolina
Prieto, Francisco
Ramírez, Diana
Ramírez, Marcelo
Redin, Gustavo
Riera-Vite, Trotsky
Rodas, Fabián
Romero, Juan Carlos
Sánchez, Didier
Santander, Tatiana
Santin, Jaime
Serrano, Felipe
Soria, Paulina
Szekely, Diana
Terán, Andrea
Ulloa, Roberto
Valarezo, Juan Carlos
Valdivieso, Sebastián
Varea, Anamaría
Velásquez, Mauricio
Waliczky, Zoltan

PERU
Allauja, Elvis
Alvarado, Lleydy
Alzamora, Mónica
Antezano, Salomé
Aragón, José
Arenas, Marco
Aucca, Constantino
Bellota, Miguel
Berrospi, Luis
Bustamante, María Gracia
Chevarría, Marco
Chimatani, Fermín
Chulla, Elizabeth
Cornejo, Fanny
Díaz, Henry
Durán, Patricia
Escalante, Ernesto
Espejo, Ana
Espinel, Luis
Espinoza, Jessica
Fernández-Baca, Jaime
Flores, Lorenzo
Flores, Luis
Franco, Oscar
Fuentealba, Beatriz
Gammie, Gena
García, Claus
Gómez, Elvira
Gordillo, Rosa
Heredia, Pedro
Herrera, Jorge
Hidalgo, Max
Hoyos, Marlon
Huamaní, Walter
Ita, Walter
Kalinowski, Bronislaw
Laporte, Melina
Leo, Mariella
Leslie, James
Mavila, Manuel
Medina, Margarita
Mendizábal, Paul
Mendoza, Eddy
Mendoza, Wilfredo
Montoya, Mariana

Noningo, Shapion
Núñez, Elio
Núñez, Noelia
Ochoa, Patricia
Olivera, Christian
Oliveros, Jessica
Ortiz, Enrique
Ortiz, Floro
Palomino, Wily
Pérez, Christian
Pilares, Rafael
Quijandría, Gabriel
Raez, Ernesto
Ramírez, Frank
Ramos, Viviana
Rondón, Marco
Rubio, Heidi
Samaniego, Cesar
Sánchez, Alan
Sánchez, Silvia
Scheske, Christel
Silva, Juvenal
Tapia, Pedro
Usuriaga, Silvia
Valdivia, María Claudia
Vargas, Juan Carlos
Vargas, Víctor
Vega, Zoila
Verde, Milton
Zárate, Claudia

UNITED KINGDOM
Bensted-Smith, Robert
Heylings Pippa

UNITED STATES
Tognelli, Marcelo
Upgren, Amy

VENEZUELA
Bautista, Jayme
Chacón, Eulogio
Cuyckens, Erica
Gámez, Luis Enrique
Hidalgo, Marcos
Jiménez, Luis
Llambí, Luis
Luy, Alejandro
Niño, Miguel
Pelayo, Roxibell
Peñaloza, Rafael
Torres, Denis
Vivas, Ilad

Workshop and survey support:

Antelo, Rafael
Borja, Judith
Cuba, Mónica
Fernández, Yara
Franco, Sandra
Frías, Yolanda
Isola, Sandra
Jaramillo, Maricruz
Jimenez, Arturo
Laporte, Melina
Lizon, Leon
López, Alfredo
Peña, Elizabeth
Romero, Chiara
Tovar, Antonio
Vargas, Julieta
Vásquez, Rocío
Vega, Claudia
Villavicencio, Daniel

English translation:

Sheila Gratton

Technical editing in English:

Nicole A. Brown
Maricruz Jaramillo
Claudia Vega

ACRONYMS

ABRAE	Áreas Bajo Régimen de Administración Especial (Venezuela) [Areas Under Special Administration Regime]
ABT	Autoridad de Bosques y Tierras (Bolivia) [Forest and Land Authority]
ACUS	Áreas de Conservación y Uso Sustentable (Ecuador) [Conservation and Sustainable Use Areas]
AECID	Agencia Española de Cooperación Internacional para el Desarrollo [Spanish Agency for International Development Cooperation]
AFD	L'Agence Française de Développement [French Development Agency]
AHN	Agencia Nacional de Hidrocarburos (Colombia) [National Hydrocarbons Agency]
AICCA	Proyecto de Adaptación a los Impactos del Cambio Climático en Recursos Hídricos en los Andes [Adaptation to the Impacts of Climate Change on Water Resources in the Andes Project]
ALADI	Asociación Latinoamericana de Integración [Latin American Integration Association]
ANLA	Autoridad Nacional de Licencias Ambientales (Colombia) [National Environmental Licensing Authority]
ANM	Agencia Nacional de Minería (Colombia) [National Mining Agency]
ARA	Articulación Regional Amazónica [Amazon Regional Articulation]
AZE	Alliance for Zero Extinction
BADEHOG	Banco de Datos de Encuestas de Hogares [Household Survey Data Bank]
BCB	Banco Central de Bolivia [Central Bank of Bolivia]
BIOFIN	Finanzas para la Biodiversidad [Finance for Biodiversity]
BMU	Bundesministerium für Umwelt, Naturschutz und nukleare Sicherheit [German Federal Ministry of the Environment, Nature Conservation, and Nuclear Safety]
BMZ	Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung [German Federal Ministry of Economic Cooperation and Development]
CAF	Corporación Andina de Fomento [Andean Development Corporation]
CAN	Comunidad Andina de Naciones [Andean Community of Nations]
CANCC	Comisión de Alto Nivel de Cambio Climático (Peru) [High Level Commission on Climate Change]
CAR	Corporaciones Autónomas Regionales (Colombia) [Regional Autonomous Corporations]
CBD	Convention on Biological Diversity
CCB	Community and Biodiversity Standard
CDM	Clean Development Mechanism
CEFOVE	Grupo Nacional de Certificación Voluntaria (Ecuador) [National Voluntary Certification Group]
CELAC	Comunidad de Estados Latinoamericanos y Caribeños [Community of Latin American and Caribbean States]
CEPF	Critical Ecosystem Partnership Fund
CI	Conservation International
CIEBREG	Centro de Investigaciones y Estudios en Biodiversidad y Recursos Genéticos (Colombia) [Research and Studies on Biodiversity and Genetic Resources]
CITES	International Trade in Endangered Species of Wild Fauna and Flora

CLPI	consentimiento libre, previo e informado [free, prior and informed consent]
CMS	Convention on Migratory Species
COICA	Coordinadora de las Organizaciones Indígenas de la Cuenca Amazónica [Coordinator of the Indigenous Organizations of the Amazon Basin]
CONAF	Corporación Nacional Forestal (Chile) [National Forestry Corporation]
CONDESAN	Consorcio para el desarrollo de la ecorregión (Ecuador)
CORFO	Corporación de Fomento de la Producción (Chile)
COSIPLAN	Consejo Suramericano de Infraestructura y Planeamiento [South American Council for Infrastructure and Planning]
CPB	Cartagena Protocol on Biosafety
CR	Critically Endangered (IUCN Red List)
CSF	Conservation Strategy Fund
CSO	Civil Society Organisation
CSTT	Civil Society Capacity Tracking Tool
DEIE	Dirección de Estadísticas e Investigaciones Económicas (Argentina) [Directorate of Statistics and Economic Research]
DGFFS	Dirección General Forestal y de Fauna Silvestre (Peru) [General Directorate of Forestry and Wildlife]
DHB	Diameter at breast height
DIPROSE	Dirección General de Programas y Proyectos Sectoriales y Especiales (Argentina) [General Directorate of Sectoral and Special Programs and Projects]
ECDBC	Estrategia Colombiana de Desarrollo Bajo en Carbono [Colombian Low Carbon Development Strategy]
ECLAC	Economic Commission for Latin America and the Caribbean
ECV	Encuesta de Calidad de Vida (Colombia) [Survey of Living Conditions]
EN	Endangered (IUCN Red List)
ENA	Encuesta Nacional Agropecuaria (Colombia) [National Agricultural Survey]
ENREDD+	Estrategia Nacional de Reducción de Emisiones por Deforestación y Degradación Forestal (Colombia) [National Strategy for Reducing Emissions from Deforestation and Forest Degradation]
EU	European Union
FAO	Food and Agriculture Organization
FAP	Fondo de Áreas Protegidas (Ecuador) [Protected Areas Fund]
FARC-EP	Fuerzas Armadas Revolucionarias de Colombia - Ejército del Pueblo [Revolutionary Armed Forces of Colombia - People's Army]
FCDS	Fundación para la Conservación y el Desarrollo Sostenible [Foundation for Conservation and Sustainable Development]
FDI	Foreign direct investment
FEDECAFE	Federación Nacional del Café (Colombia) [National Federation of Coffee Growers]
FEDEGAN	Federación Colombiana de Ganaderos (Colombia) [Federation of Colombian Cattle Ranchers]
FFI	Fauna & Flora International
FFLA	Fundación Internacional para la Promoción del Desarrollo Sustentable Futuro Latinoamericano [Latin American Future Foundation]
FIAS	Fondo de Inversión Ambiental Sostenible (Ecuador) [Sustainable Environmental Investment Fund]

FIMA	Fiscalía del Medio Ambiente (Chile) [Environmental Prosecutor's Office]
FONAM	Fondo Nacional Ambiental (Colombia) [National Environmental Fund]
FUNDESNAP	Fundación para el Desarrollo del Sistema Nacional de Áreas Protegidas (Bolivia) [Foundation for the Development of the National Protected Areas System]
FZS	Frankfurt Zoological Society
GCF	Green Climate Fund
GDP	Gross Domestic Product
GEF	Global Environment Facility
GHG	greenhouse gas
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit [German Agency for International Cooperation]
GORESAM	Gobierno Regional de San Martín (Peru) [San Martin Regional Government]
GTT	Gender Tracking Tool
HDI	Human Development Index
IBA	Important Bird Area
IBCE	Instituto Boliviano de Comercio Exterior [Bolivian Institute of Foreign Trade]
ICRAF	World Agroforestry Center
IDEAM	Instituto de Hidrología, Meteorología y Estudios Ambientales (Colombia) [Institute of Hydrology, Meteorology and Environmental Studies]
IED	inversión extranjera directa [foreign direct investment]
IHA	International Hydropower Association
IIRSA	Iniciativa para la Integración de la Infraestructura Regional Suramericana [Initiative for the Integration of Regional Infrastructure in South America]
IKI	Internationale Klimaschutzinitiative [International Climate Initiative]
IMF	International Monetary Fund
INDEC	Instituto Nacional de Estadística y Censos (Argentina) [National Institute of Statistics and Census]
INDH	National Institute of Human Rights
INE	Instituto Nacional de Estadística (Bolivia) [National Statistics Institute]
INPARQUES	Instituto Nacional de Parques (Venezuela) [National Parks Institute]
IPCC	Intergovernmental Panel on Climate Change
IUCN	International Union for Conservation of Nature
IUCN Red List	International Union for Conservation of Nature (IUCN) Red List of Threatened Species
IUCN SSC	IUCN Species Survival Commission
IWRM	Integrated water resources management
JICA	Japan International Cooperation Agency
KBA	Key Biodiversity Area
KfW	Kreditanstalt für Wiederaufbau
LatinClima	Red de Comunicación en Cambio Climático [Climate Change Communication Network]
LULUCF	Land use, land use change and forestry
LVT	Long-term vision
MAAE	Ministerio de Ambiente y Agua (Ecuador) [Ministry of Environment and Water]

MAAP	Proyecto Monitoreo de la Amazonía Andina [Amazon Andes Monitoring Project]
MAB-UNESCO	Man and the Biosphere Program of the United Nations Educational, Scientific and Cultural Organization
MADS	Ministerio del Ambiente y Desarrollo Sostenible (Colombia) [Ministry of Environment and Sustainable Development]
MERCOSUR	Mercado Común del Sur [Sourthern Common Market]
MINAGRI	Ministerio de Agricultura y Riego (Peru) [Ministry of Agriculture and Irrigation]
MINAM	Ministerio del Ambiente (Peru) [Ministry of Environment]
MINCETUR	Ministerio de Comercio Exterior y Turismo (Peru) [Ministry of Foreign Trade and Tourism]
MINEC	Ministerio del Poder Popular para el Ecosocialismo (Venezuela) [Ministry of People's Power for Ecosocialism]
MPI	Multidimensional Poverty Index
NCI	Nature & Culture International
NDC	Nationally Determined Contributions
NDF	Nordic Development Fund
NGO	Non-governmental organization
Norad	Norwegian Agency for Development Cooperation
OCMAL	Observatory of Mining Conflicts in Latin America
OEC	Observatory of Economic Complexity
OMEC	Otras Medidas de Conservación Basadas en Áreas (Peru) [Other effective area-based conservation modalities]
OTCA	Organización del Tratado de Cooperación Amazónica [Amazon Cooperation Treaty Organization]
PDES	Plan de Desarrollo Económico Social (Bolivia) [Social Economic Development Plan]
PDyOT	Planes de Desarrollo y Ordenamiento Territorial [Land development and management plans]
PNCBMCC	Programa Nacional de Conservación de Bosques para la Mitigación del Cambio Climático (Perú) [National Forest Conservation Program for Climate Change Mitigation]
PNN	Parque Natural Nacional (Colombia) [National Natural Park]
PROFONANPE	Fondo de Promoción de la Áreas Naturales Protegidas del Perú [Fund for the Promotion of Peru's Natural Protected Areas]
PROSAP	Programa de Servicios Agrícolas Provinciales (Argentina) [Provincial Agricultural Services Program]
PROSUR	Foro para el Progreso de América del Sur [Forum for the Progress and Development of South America]
PSB	Programa Socio Bosque (Ecuador) [Socio Bosque Program]
PUGS	Planes de Uso y Gestión del Suelo [Land-use and management plans] (by its acronym in Spanish)
RAISG	Red Amazónica de Información SocioAmbiental Georferenciada [Amazonian Network of Geo-referenced Socio-environmental Information]
RAMSAR	Convention on Wetlands of International Importance
RBV	Relative biodiversity value
RECC	Red Ecuatoriana de Cambio Climático [Ecuadorian Climate Change Network]
RED	REDD Early Movers

RED AMA	Red de Conservación Voluntaria de Amazonas [Amazon Voluntary Conservation Network]
RED DBA	Red de Iniciativas de Conservación de la Biodiversidad de Amazonas (Peru) [Amazon Biodiversity Conservation Initiatives Network]
REDD	reducing emissions from deforestation and forest degradation
REDD+	reducing emissions from deforestation and forest degradation, and the conservation and enhancement of forest carbon stocks
REINFO	Registro Integral de Formalización Minera (Peru) [Integral Mining Formalization Registry]
RENAMI	Registro Nacional de Medidas de Mitigación (Peru) [National Registry of Mitigation Measures]
RIA	REDD+ Indígena Amazónica [Amazon Indigenous REDD+]
RIT	Regional Implementation Team
RNSC	Reservas Naturales de la Sociedad Civil [Civil society nature reserves]
SARS	Severe Acute Respiratory Syndrome
SDC	Swiss Agency for Development and Cooperation
SDG	Sustainable Development Goals
SEREMI	Secretarías regionales ministeriales (Chile) [Regional ministerial secretariats]
SERFOR	Servicio Nacional Forestal y de Fauna Silvestre (Peru) [National Forestry and Wildlife Service]
SERNANP	Servicio Nacional de Áreas Naturales Protegidas por el Estado (Peru) [National Service of Natural Areas Protected by the State]
SERNAP	Servicio Nacional de Áreas Protegidas (Bolivia) [National Service for Protected Areas]
SIAC	Sistema de información ambiental [Colombian environmental information system]
SIFAP	Sistema Federal de Áreas Protegidas (Argentina) [Federal System of Protected Areas]
SINA	Sistema Nacional Ambiental (Colombia) [National Environmental System]
SINANPE	Sistema Nacional de Áreas Protegidas por el Estado (Peru) National System of Natural Areas Protected by the State
SINAP	Sistema Nacional de Áreas Protegidas (Colombia) [National System of Protected Areas]
SNAP	Sistema Nacional de Áreas Protegidas (Bolivia) [National System of Protected Areas]
SNAP	Sistema Nacional de Áreas Protegidas (Ecuador) [National System of Protected Areas]
SNASPE	Sistema Nacional de Áreas Protegidas (Chile) [National System of State Wildlife Protected Areas]
TCO	Territorios Comunitarios de Origen (Bolivia) [Community Territories of Origin]
TDC	Transferencias Directas Condicionadas (Peru) [Conditional Direct Transfers]
TNC	The Nature Conservancy
TNC	Third national communications
UNALM	Universidad Nacional Agraria La Molina (Peru) [La Molina National Agrarian University]
UNASUR	Unión de Naciones Suramericanas [Union of South American Nations]
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme

UNEP-WCMC	UN Environment Programme World Conservation Monitoring Centre
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
UN-REDD	United Nations Programme on Reducing Emissions from Deforestation and Forest Degradation
UNWTO	World Tourism Organization
USAID	United States Agency for International Development
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
VCS	Verified Carbon Standard
VMA	Viceministerio de Medio Ambiente, Biodiversidad, Cambios Climáticos y Gestión y Desarrollo Forestal (Bolivia) [Vice-Ministry of Environment, Biodiversity, Climate Change and Forest Management and Development]
VU	Vulnerable (IUCN Red List)
WCS	Wildlife Conservation Society
WHC	World Heritage Convention
WTTC	World Travel and Tourism Council
WWF	World Wildlife Fund

CONTENTS

EXECUTIVE SUMMARY

The Critical Ecosystem Partnership Fund (CEPF) safeguards the planet's most biologically rich and threatened regions, known as biodiversity hotspots. It is a joint initiative of l'Agence Française de Développement, Conservation International, the European Union, the Global Environment Facility, the Government of Japan and the World Bank.

A key purpose of CEPF is to engage and empower civil society, such as community groups, non-governmental organizations (NGOs), academic institutions and private companies in the conservation of global biodiversity. To ensure their success, these efforts must complement the strategies and programs of national governments and other donors. To this end, CEPF promotes partnerships among diverse groups, combining unique capabilities and reducing duplication of efforts to achieve a participatory, comprehensive, and coordinated approach to biodiversity conservation. To achieve this, CEPF develops ecosystem profiles, shared strategies developed in consultation with local stakeholders that articulate a five-year investment strategy supported by a detailed situation analysis.

This document presents the ecosystem profile of the Tropical Andes Hotspot, the most biodiverse on the planet. Home to more than 35,000 plant and vertebrate species, it ranks first in plant, bird, mammal, and amphibian diversity and second in reptile diversity of the 36 hotspots identified to date in the world. With its 158.3 million hectares, the hotspot is three times the size of Spain and extends across the Cordillera of the Andes through Venezuela, Colombia, Ecuador, Peru, and Bolivia, as well as the northern portions of the Andes in Argentina and Chile.

Despite various conservation interventions in the hotspot over the years, its biodiversity and ecosystems continue to face serious threats, which have been exacerbated by the COVID-19 pandemic. At the same time, Andean civil society has been strengthened, and is well positioned to address threats as environmental leaders in the hotspot.

Background to the Preparation of the Ecosystem Profile

CEPF provides funding for civil society action in areas where globally significant biodiversity is seriously threatened. CEPF has had two phases of investment in the Tropical Andes: Phase I, between 2001 and 2006 with a consolidation phase from 2009 to 2013, where it invested US$8.135 million through 67 projects in Bolivia and Peru, and Phase II, from 2015 to 2021, when US$9.5 million was invested in 100 projects in Colombia, Ecuador, Peru, and Bolivia.

The results of these investments were significant. More than 5.1 million hectares came under new legal protection, and approximately 11 million hectares of habitat possessing among the highest levels of biodiversity and levels of threat in the hotspot experienced management improvements in support of biodiversity conservation and local communities. In total, 284 globally threatened species benefited. More than 300 indigenous and mestizo communities, many scattered across the far reaches of the highest mountain range of the Americas, benefitted from the conservation of their ecosystems, through the generation of new sources of income, improved access to clean plentiful water, improved food security, and strengthened governance of their lands. More than 65 Andean-based civil society organizations were direct grant recipients. Over 100 stakeholder alliances brought governmental, civil society, community, and private sector stakeholders together to collaboration on conservation and sustainable development initiatives.

Based on the results of these investment phases, CEPF's Donor Council decided to reinvest in the hotspot to consolidate and expand the achievements and set the hotspot on a stronger trajectory towards long-term sustainability and resilience.

This ecosystem profile sets out how CEPF will support civil society efforts to that end. This document was developed between July 2020 and March 2021 and captures the efforts of three complementary processes: 1) a strategic planning process with a focus on Ecuador in collaboration with KfW Germany; 2) the updating of this ecosystem profile for the entire hotspot through a process that involved 268 stakeholders from 103 organizations from civil society, the public sector, and donors; and 3) the preparation of a long-term vision for the hotspot involving more than 100 people.

Key Findings

The more than 130 ecosystems identified in the hotspot are home to more than 35,000 plant and vertebrate species, and 1,451 species are threatened with extinction according to the IUCN Red List, including 239 Critically Endangered (CR) and 625 Endangered (EN) species.

The hotspot provides essential ecosystem services for the planet, the South American continent and the approximately 59.7 million people living within the Tropical Andes, particularly those services related to water resources and carbon. Its peaks are the sources of the world's largest river, the Amazon, and the main tributaries of the Orinoco and Paraguay rivers, the third and seventh largest rivers in the world respectively. Its water network nourishes diverse ecosystems that are home to thousands of species and supplies water to numerous agricultural areas and cities inside and outside the hotspot. Four country capitals and 29 cities with more than 200,000 inhabitants within the hotspot benefit directly from these ecosystem services. The Tropical Andes Key Biodiversity Areas (KBAs) collectively store 7,345 million metric tons of carbon in their plant biomass, a volume that slightly exceeds Mexico's carbon budget from 2016 to 2025 to comply with the Paris Agreement. The Tropical Andes is the second most important hotspot in the world for irrecoverable carbon stocks. It holds 314,291,735 metric tons of irrecoverable carbon, which, if lost, could not be restored by 2050.

Despite their strategic importance, of the 474 KBAs in the hotspot, 173 are unprotected, and of these, 44 KBAs correspond to Alliance for Zero Extinction (AZE) sites. AZE sites contain the entire population of one or more species listed as Endangered or Critically Endangered on the IUCN Global Red List.

The hotspot, however, faces serious problems: mining, climate change, agricultural encroachment, deforestation, illegal land occupation, hunting and wildlife trafficking, and new infrastructure, among others. In the period from 2001 to 2019, almost 4 million hectares of forest were lost in the hotspot. Similarly, glacier masses continue to decrease to the point that, in a few years, Venezuela will be the first country on the continent to lose all its glaciers. Likewise, mining concessions granted by the national governments cover 11 percent of the hotspot and illegal mining continues to be a problem that is difficult to solve. Agricultural expansion affects 65 percent of the 474 KBAs in the hotspot to varying degrees and has altered 31 percent of the hotspot's surface area. Illegal trade of species in the hotspot contributes to an illicit business that moves between US$7 billion and US$23 billion worldwide, the fourth most lucrative after drugs, arms and human trafficking.

The Tropical Andes also possesses an exceptional cultural diversity. The population inhabiting the hotspot is mostly mestizo. However, some 10 million indigenous people from more than 50 ethnic groups are said to inhabit at least 21 percent of the hotspot's surface, including several KBAs. Therefore, it is essential to develop cooperative mechanisms with indigenous organizations and to design strategies to strengthen their capacities for the sustainable management of their territories.

Between 2019 and 2021, all hotspot countries suffered the consequences of serious political instability and governance crises that resulted in civil unrest, especially in the capitals and major cities of Bolivia, Chile, Ecuador and Peru. For example, during the preparation of this ecosystem profile, Peru had three presidents in one week in November 2020.

In addition, in recent years, there has been an increase in pressures and threats against environmental leaders who resist the advance of extractive activities in their territories. According to a report by Global Witness, in 2019, Colombia was the country with the highest number of assassinations of environmental leaders worldwide, and this high rate continues to date. These data reflect the urgency of adopting safeguard actions in favor of people and communities that are vulnerable or at risk of being vulnerable.

The total estimated investment in natural resource management in the hotspot in the period from 2015 to 2019 amounted to US$676.6 million, of which 45 percent, equaling US$307.3 million, supported direct biodiversity conservation objectives. Despite their vital roles in leading and supporting conservation, the 400 or so Andean-based environmental groups accessed 5 percent of funding for natural resources management projects, equaling US$57.6 million over the five-year period, with CEPF being the second largest donor after the GEF. On a per annual basis, annual funding for natural resources management for local conservation groups equaled US$18,050 per organization spread over the entire hotspot. Despite the considerable amount invested, the overall level of support for conservation in the hotspot from governments, the private sector and international donors remains wholly insufficient to address the massive and accelerating threats to biodiversity.

The COVID-19 pandemic has dramatically affected the Tropical Andes, killing nearly 110,000 people in Colombia, Ecuador, Peru and Bolivia by January 2021. According to the IMF, the pandemic is causing the worst regional recession in recorded history. According to the Economic Commission for Latin America and the Caribbean, in 2020, the GDP of the hotspot countries decreased between 5.2 percent in Bolivia and 12.9 percent in Peru. This contraction will undoubtedly reduce public investment in conservation in the coming years, which could, in turn, affect the budget allocated for the administration and management of protected areas, many of which are KBAs. On the other hand, economist predict the serious economic crisis facing the region will have a direct impact on the already high levels of poverty, which in many cases could translate into greater pressure on natural resources. In this context of humanitarian crisis and economic uncertainty, the price of an ounce of gold reached an all-time high and surpassed US$2,000, intensifying gold mining in the hotspot. The pandemic also exposed vulnerabilities of environmental CSOs, who lack financial reserves and secure funding to withstand the economic downturn in their countries.

This confluence of factors has led to an increase in threats to the hotspot's biodiversity and uncertainty about the ability to manage these threats in the short term. However, with increasing evidence of the links between anthropogenic impacts on nature and the spread of zoonotic diseases such as coronavirus, the pandemic may generate new funding opportunities to drive economic recovery based on green policies. These new windows of opportunity should be used to leverage funding during the implementation of CEPF’s Phase III investments, which also has the advantage of building on the gains made to date.

CEPF Phase III Niche and Investment Strategy

In light of the urgent needs created and/or exacerbated by the COVID-19 crisis, the CEPF niche for Phase III in the Tropical Andes channels support to civil society organizations to foster the long-term sustainability of the results achieved through previous CEPF investments and to replicate the best conservation practices piloted to date to benefit those new sites of exceptional levels of biodiversity that have crucial conservation needs required to ensure their survival.

The niche builds on experience from the first two investment phases by focusing on approaches that have demonstrated success, moving from pilot projects to longer-term interventions, and integrating results more concretely into public policy and private sector practice. Phase III continues CEPF support to the same four of the seven Andean countries: Colombia, Ecuador, Peru and Bolivia. It also aims to engage civil society groups working in the hotspot of Venezuela, Chile and Argentina in virtual capacity buildng and networking. In the short term, the niche seeks to support local communities to cope with the impacts of the pandemic and to stem environmental degradation in areas of high biodiversity value by supporting secure land tenure, fostering sustainable livelihoods, and combating wildlife trafficking and hunting. For the long term, CEPF will support sustainability and resiliency by solidifying the technical and project management capacities of local civil society, diversifying funding streams for conservation over the long term, and institutionalizing conservation outcomes into public and private sector strategies and practice. Recognizing that CEPF investment cannot realistically respond to the full range of conservation issues at play in the hotspot, the CEPF niche focuses on actions where civil society organizations can add the greatest value, and addresses gaps in the overall landscape of donor funding for conservation.

The biological basis for CEPF investment is provided by conservation outcomes: the quantifiable set of species, sites and corridors that must be conserved to curb loss of global biodiversity. The conservation outcomes in the Tropical Andes were defined in the 2015 ecosystem profile and were updated in this profile to reflect new information on the status of species, sites and corridors.

The list of species outcomes in the hotspot increased from 814 in 2015 to 1,451 in 2020, reflecting increases in the number of globally threatened species officially recognized on the IUCN Red List. In Phase III, CEPF will support conservation actions to safeguard 183 Critically Endangered (CR) and Endangered (EN) species to prevent their extinction. These 183 species are comprised of 82 amphibians, 32 birds, 11 mammals, 10 reptiles, 41 plants, and 7 fish. Initiatives build on species-level advancements made in Phase II through the planning, implementation, and institutionalization of species action plans for 70 species. Phase III recognizes that species conservation plans and actions need to be further institutionalized to sustain and increase support for species conservation in the hotspot. It also recognizes that conservation of amphibians and plants often require an approach based on the conservation of entire genera to complement species-center approaches.

The CEPF niche calls for supporting conservation in seven conservation corridors that are home to 52 of the 474 KBAs identified in the hotspot. The 52 prioritized KBAs cover 4.0 million hectares, equivalent to 2.5% of the hotspot area. To enable investment by CEPF and other funders to be directed effectively, site outcomes were prioritized using standard criteria, including urgency of conservation action and opportunity to enhance existing conservation efforts. The 52 priority KBAs include hotspot’s most biologically diverse sites that have a demonstrated and significant need for CEPF support due to the presence of a substantial threat but where conservation capacity remains insufficient. Here, civil society has the potential to affect a meaning change through channeling CEPF investment for long-term conservation and development benefits.

The thematic priorities for conservation investment in the hotspot were defined through the stakeholder consultation process, based upon an analysis of the main threats to biodiversity in the hotspot and their root causes. The overall ranking of threats did not change significantly from that generated by the stakeholder consultations in 2015. In both exercises, the top-ranked threats and drivers were mining, agricultural encroachment, insecure land tenure, wildlife hunting and trafficking, illegal logging, colonization, and new infrastructure (mainly roads and dams). Unlike in 2015, climate change was identified as the highest-ranking threat to biodiversity in 2020.

To respond to these threats and help address some of their root causes, the Phase III investment strategy builds on the achievements and lessons learned from previous phases by supporting five strategic directions and 22 investment priorities. The strategy seeks to address short-term conservation needs while putting the hotspot on the trajectory toward achievement of the hotspot long-term vision, to building local conservation capacity for civil society, securing more stable and diversified sources of funding, institutionalize conservation outcomes, foster strong private sector engagement for conservation. The niche adopts five cross-cutting themes regarded as essential to achieve CEPF's overall conservation objectives: 1) revival of COVID-19 impacted sites and economies based on green objectives; 2) mainstreaming of gender equality into conservation strategies; 3) strengthening of capacities of indigenous peoples and local civil society; 4) fostering long-term financial sustainability; and 5) contributing to climate change adaptation and mitigation. Building on the multi-stakeholder alliances established and strengthening in previous investments, Phase III fosters multi-sectoral collaboration between local communities, civil society, government, and the private sector.

The Phase III investment strategy builds on the significant accomplishments achieved by CEPF and partners to date in the hotspot, while setting a new stage toward greater resiliency and sustainability over the long term. Although ambitious, the investment strategy is realistic, and represents an important opportunity to realize the potential of civil society in the hotspot, and to make a lasting contribution to the conservation of Tropical Andes' unique and irreplaceable biodiversity and ecosystem services of global importance, including for climate change mitigation.

Table 1. CEPF's Strategic Directions and Investment Priorities for the Tropical Andes Hotspot

Strategic directions	Investment Priorities
1. Strengthen protection and management of 52 priority KBAs to foster participatory governance, green recovery from COVID-19, climate change resilience, species conservation, and financial sustainability.	1.1 Facilitate the establishment, upgrading, and/or expansion of public and private protected areas.
	1.2 Prepare and implement participatory management plans and other relevant KBA management instruments that support broad stakeholder collaboration.
	1.3 Strengthen land tenure, management, and governance of indigenous territories and campesino communities
	1.4 Enable local communities to enter and remain in incentive programs that benefit biodiversity conservation.
	1.5 Promote and strengthen bio-enterprises that support biodiversity conservation and provide gender-equitable benefits to local communities.

2. In the seven priority corridors, collaborate with public and private sector stakeholders to enable biodiversity conservation, a green recovery from COVID-19, and environmental, financial, and social sustainability, in benefit of the priority KBAs.	2.1 Support participatory land-use and development plans and governance frameworks to foster a shared vision of conservation and sustainable development to guide future investments.
	2.2 Support the preparation of policies, programs, and projects that foster biodiversity conservation, particularly at sub-national levels, and that leverage funding for their implementation.
	2.3 Support the dissemination and integration of the conservation outcomes (threatened species, KBAs and corridors) in the strategic plans and public policies of governments, donors, and the private sector.
	2.4 Establish and strengthen traditional and innovative financial mechanisms and leverage financing initiatives for conservation, including payments for ecosystem services, carbon credits and compensation mechanisms.
	2.5 Promote and scale up bio-enterprises to benefit communities, biodiversity, connectivity, and ecosystem services.
	2.6 Promote private sector actors and their associations to integrate conservation into their business practices and to implement corporate social responsibility policies and voluntary conservation commitments.
	2.7 Integrate biodiversity conservation objectives into policies and programs related to mining and infrastructure and promote related demonstration projects.
	2.8 Strengthen local capacity, facilitate public consultation, and support partnerships to implement mitigation measures (assess, avoid, mitigate and monitor impacts) in projects that present a risk to priority KBAs, with a focus on mining and infrastructure.
3. Safeguard priority globally threatened species.	3.1 Prepare, implement, and institutionalize conservation action plans that include climate change resilience for 183 critically endangered (CR) and Endangered (EN) species, and for select genera, presented in Appendix 13.3.
	3.2 Support strategies and information campaigns to combat illegal wildlife trafficking and hunting in the KBAs and conservation corridors.
4. Cultivate a highly-trained, well-coordinated and resilient civil society sector at the local, corridor, and hotspot levels to achieve CEPF's conservation outcomes.	4.1 Strengthen the institutional capacities (administrative, financial, fundraising, communications, governance, and project management) of CEPF's strategic partners to implement biodiversity conservation programs.
	4.2 Strengthen the technical knowledge and skills of civil society through short-term courses to implement practical conservation actions based on an evaluation and training strategy.
	4.3 Support a security strategy and alliance to safeguard at-risk environmental and indigenous defenders.
	4.4 Strengthen the strategic communication capacity of the media and civil society networks to create conservation awareness among the public and decision makers.
	4.5 Strengthen the capacities and involvement of women in CEPF initiatives.
	4.6 Improve stakeholder cooperation and strengthen alliances, and foster information exchange and lessons learned.

5. Provide strategic leadership and effective coordination of CEPF investment through a regional implementation team (RIT).	5.1 Create a broad community of civil society groups working across institutional and geographic boundaries, to strengthen their capacities and promote their long-term resilience, to support CEPF's mission and conservation goals.

1 INTRODUCTION

The Tropical Andes Biodiversity Hotspot is one of 36 biodiversity hotspots in the world that together cover 16.7 percent of Earth's land surface. Biodiversity hotspots contain at least 1,500 endemic plant species and have lost at least 70 percent of their natural habitat (Mittermeier *et al.* 2004). Six hotspots are located in Central and South America: Mesoamerica, Tropical Andes, Tumbes-Chocó-Magdalena, Atlantic Forest, Cerrado and Chilean Winter Rainfall-Valdivian Forests. The Amazon High Biodiversity Wilderness Area is adjacent to the Tropical Andes. The Tropical Andes Hotspot covers vast areas of Ecuador, Colombia, Bolivia and Peru and includes sections of Venezuela, Chile and Argentina (Figure 1.1). Its 158.3 million hectares exceed the area of France, Spain and Germany combined.

Diverse climates, complex geography and geology have given rise to the evolution of multiple habitats and an extraordinary biological diversity that make the Tropical Andes Hotspot the most biodiverse hotspot in the world. Furthermore, the hotspot's mountains, valleys and plateaus are home to 1,451 globally threatened species, which is one of the world's highest numbers of threatened species.

Founded in 2000, the Critical Ecosystem Partnership Fund (CEPF) is designed to ensure civil society is engaged in biodiversity conservation with a holistic landscape ecology perspective. CEPF 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, and the World Bank. CI administers the global program through the CEPF Secretariat.

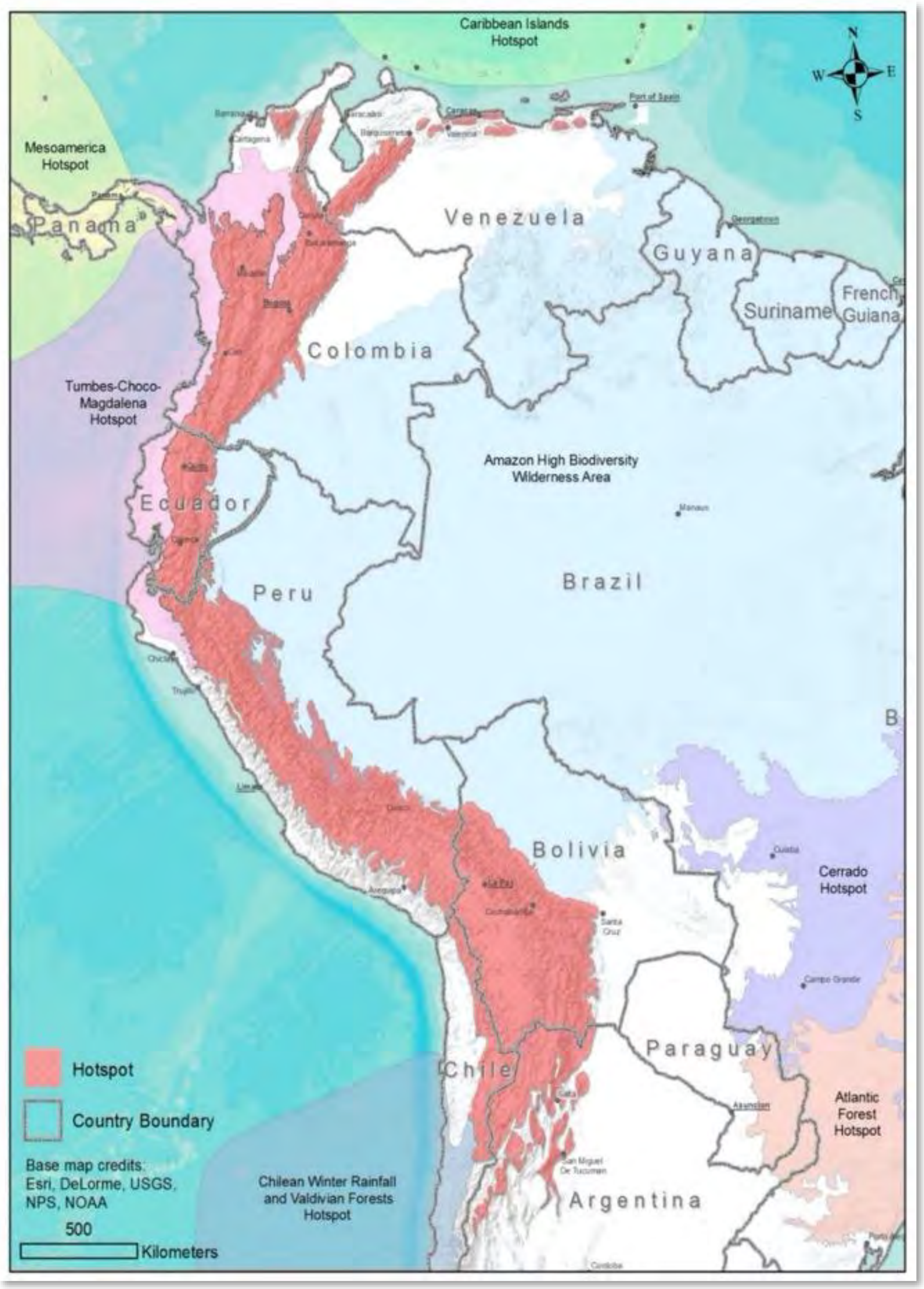
CEPF is unique among funding mechanisms in that it focuses on the world's biodiversity hotspots rather than on political boundaries and addresses conservation threats on a landscape scale. Within each hotspot, and depending on its particularities, CEPF can work at the corridor level to ensure the protection of the key biodiversity areas (KBAs) that it contains.

CEPF promotes working partnerships among community-based organizations (CBOs), non-governmental organizations (NGOs), governments, academic institutions and the private sector, combining unique capacities and eliminating duplication of efforts for a comprehensive approach to conservation. CEPF seeks to bring about transboundary cooperation for areas of high biological value that cross national borders or in areas where a regional approach may be more effective than a national one.

CEPF has had two phases of investment in the Tropical Andes Hotspot:

- Phase I, from 2001 to 2006 including a consolidation phase from 2009 to 2013, with a total investment of US$8.135 million through 67 projects. It targeted the Vilcabamba-Amboró Conservation Corridor of southern Peru and northern Bolivia, a 30-million-hectare swath of forested landscapes.
- Phase II, from 2015 to 2021, with a total investment of US$9.5 million through 100 projects implemented by 65 civil society organizations. It aimed to conserve 36 KBAs in seven conservation corridors in Colombia, Ecuador, Peru, and Bolivia.

Figure 1.1 Location of the Tropical Andes Hotspot



Six years have passed since the publication of the last ecosystem profile and in this time, conditions in the region have changed. New species have been described, evaluated and added to the International Union for Conservation of Nature (IUCN) Red List of Threatened Species. New KBAs have been defined, especially for reptiles and plants, with CEPF support. The frequency and intensity of threats have changed, especially those exacerbated by the COVID-19 pandemic. The region's political landscape is ever-changing, and its economies are not as healthy as in the previous investment period. All these factors have affected the context in which civil society works. In addition, investment in conservation is different, not only in terms of donors but also in terms of investment priorities. The analysis of the sum of these elements has determined CEPF's investment strategy for the next period.

This ecosystem profile was updated through a participatory process. It was developed by analyzing secondary information, consulting with experts, and engaging in discussions with governments and civil society organizations in the region through interviews, surveys, and national and regional consultation workshops. To this end, 268 people contributed their time and knowledge from July 2020 to March 2021 to realize this update of the Tropical Andes ecosystem profile.

2 BACKGROUND

This ecosystem profile contains an analysis of the social, environmental, economic, and political conditions that influence biodiversity conservation in the hotspot. In addition, this profile defines the niche for CEPF's intervention and establishes the strategy that will guide grantmaking in the Tropical Andes Hotspot between 2021 and 2026.

Three complementary processes supported the ecosystem profile update:

- Between January and August 2020, Germany’s KfW and the CEPF Secretariat conducted a strategic planning process focusing on Ecuador, in collaboration with Ecuador's EcoCiencia Foundation and the Fundación Internacional para la Promoción del Desarrollo Sustentable Futuro Latinoamericano (FFLA), which served as the Ecuador Regional Implementation Team (RIT) for CEPF. This process involved various consultations with Ecuadorian experts, government officials and other stakeholders. KBAs and priority species eligible for funding were identified based on an analysis that incorporated new plant and reptile species on the IUCN Red List and KBAs. This process made it possible to prioritize the species, sites and corridors to be funded. The results of this work for Ecuador have been integrated into this ecosystem profile update.
- In July 2020, an alliance of five civil society organizations assumed leadership of the process to update the ecosystem profile for the hotspot. The alliance leader, Pronaturaleza of Peru, worked closely with Panthera Colombia, Arcoiris of Ecuador, Practical Action based in Peru and Bolivia, and BirdLife International in its role as manager of the global KBA database on behalf of the KBA Partnership. The core team comprised 12 hotspot professionals specialized in a range of topics linked to biodiversity in the Tropical Andes: Andean species, threats to biodiversity, environmental policy, socioeconomics, civil society, climate change and conservation investments.
- From September 2020 and March 2021, Talking Transformation, a UK-based company with extensive experience in the Andes, facilitated the development of a long-term vision for the hotspot. The vision and supporting goals are intended to ensure that civil society organizations have sufficient collective capacity and access to resources in the medium and long-term to lead biodiversity conservation in the Tropical Andes when CEPF concludes its engagement in the hotspot.

These three processes were rolled out in a coordinated manner. The civil society context, niche and investment strategy sections of the profile, in particular, benefitted from this innovative, multi-pronged approach.

2.1 Information Compilation and Analysis

The compilation of information for the profile was carried out through two mechanisms: research and analysis of secondary information, and consultations with stakeholders through individual interviews, surveys, and consultation workshops.

The desk research involved the compilation and analysis of technical and scientific literature on abiotic characteristics of the hotspot, biodiversity, threats to ecosystems, social, economic, political and civil society contexts in the hotspot, as well as an analysis of the conservation investment in the hotspot during the last five years. Information about the socioeconomic, political and civil society contexts of Colombia, Ecuador, Peru and Bolivia was gathered through 32 interviews with key actors in these countries.

Another source of primary information was a digital survey sent to key stakeholders in the seven countries that are part of the Tropical Andes Hotspot. The 146 respondents to the survey represented civil society, academia, national and subnational governments and indigenous communities. Survey results provided valuable information related to conservation outcomes, KBAs, corridors, threats, civil society context, climate change, COVID-19 effects and KBA prioritization criteria. The analysis of this information was used to simulate dialogue at the national workshops.

2.2 Stakeholder Consultation

The Pronaturaleza alliance organized four national consultation workshops and one regional workshop, in which a total of 268 stakeholders from 103 non-governmental organizations, indigenous communities, universities, national and sub-national governments and donor communities from Bolivia, Peru, Colombia and Ecuador participated (Table 2.1). Due to the COVID-19 pandemic, the workshops were conducted virtually. The agenda of these workshops included adjustments to the conservation corridors established in the previous profile and the prioritization of KBAs for funding. Issues related to the working environment of CSOs were discussed in depth, along with CEPF's investment strategy. The duration of the national workshops depended on the number of corridors and KBAs analyzed for prioritization. In Peru and Bolivia, the workshops lasted one day; in Colombia one and a half days, while in Ecuador, the event took half a day.

The consultations carried out in Ecuador by EcoCiencia included a series of virtual meetings to review the prioritization of the KBAs that will receive funding and discuss and validate the investment strategy in the country.

Table 2.1. Stakeholder consultation schedule

Workshop	Date(s)	Number of participants[1]
National consultation in Ecuador*	May 22 to June 30, 2020	38
National consultation in Bolivia	October 5 and 6, 2020	15
National consultation in Peru	October 5 and 6, 2020	52
National consultation in Colombia	October 7 and 8, 2020	57
National consultation in Ecuador	October 19, 2020	42
Regional consultation	February 4, 2021	50

[1] Does not include members of CEPF or the profiling team. * Carried out by EcoCiencia Foundation.

The updating process also received input from an external advisory committee established to provide guidance and participate in key decisions during the profile update process. The committee comprised three internationally recognized experts in environmental policy, socioeconomics, conservation planning and private sector participation in the Andes.

Finally, a virtual regional workshop was held to present, discuss and validate CEPF's investment strategy in the Tropical Andes for Phase III. The consolidated version of the investment strategy was sent to participants in advance of the meeting, and their feedback incorporated into the version of the document that was discussed during the regional event.

2.3 Donor Review and Approval

The entire process of updating the ecosystem profile was supported and supervised by the CEPF Secretariat, which reviewed and approved this document. The CEPF Donor Working Group reviewed the draft profile in April 2, 2021. Comments were incorporated and the updated draft was reviewed by the Working Group in April 15, 2021. The final version of the ecosystem profile was presented to the CEPF Donor Council on April 23, 2021 and no-objection approval secured on June 10, 2021.

3 CEPF INVESTMENT IN THE TROPICAL ANDES HOTSPOT: OVERVIEW AND LESSONS LEARNED (2001 - 2021)

CEPF has invested in the Tropical Andes Hotspot in two previous investment phases, with Phase I taking place from 2001 to 2013, and Phase II spanning 2015 to 2021. The proposed third phase, which will be guided by the investment strategy set out in the updated ecosystem profile, follows on the results and momentum built from the second investment phase. It is critical, therefore, to thoroughly review the key results and impacts achieved in each investment phase and to be guided by the lessons learned. Such a review permits the reinforcement and scaling up of effective conservation approaches in the third investment phase, while also allowing for well-known bottlenecks to be avoided to the extent possible. Chapter 3, therefore, highlights the results and lessons learned from CEPF's experience in the hotspot to provide additional context to CEPF's future investment niche and strategy presented in Chapters 12 and 13.

3.1 CEPF Investment Phase I (2001–2013)

The Tropical Andes Hotspot was among the first three regions selected by CEPF for investment when the fund was established in 2001. The original ecosystem profile was developed in 2001 through a consultative process and desk study coordinated by the Bolivia and Peru country programs of Conservation International (CI). CI hosted two consultation workshops to develop the investment strategy. Consensus emerged on the need to create a conservation mega-corridor, consisting of a mosaic of protected areas and reserves, to be managed as a cohesive management unit. To achieve this vision, CEPF and partners adopted an ambitious landscape-scale agenda that called for strengthening the Vilcabamba-Amboró Corridor, a 30-million hectares swath of forest covering 20 percent of the entire hotspot and containing 16 large protected areas in Bolivia and Peru. At the time, conservation efforts in the corridor were nascent, and therefore laying the groundwork for long-term conservation action was considered essential.

The CEPF investment strategy supported six strategic directions with an allocation of US$6.13 million over a five-year period from 2001 to 2006:

1. Establish effective mechanisms for cross-border coordination, collaboration, and catalytic action in the Vilcabamba-Amboró Corridor.
2. Strengthen binational coordination of protected area systems.
3. Stimulate community conservation of biodiversity and the management of natural resources.
4. Strengthen public awareness and environmental education.
5. Strengthen environmental policy and legal frameworks to mitigate the impacts of extractive industries, transportation and infrastructure projects, and large-scale tourism.
6. Establish an electronic exchange of information and a coordinated mechanism for the collection of information and data.

In 2009, three years after the close of Phase I grants, CEPF embarked on a so-called "consolidation" of Phase I investments as a response to the imminent completion of two major road projects: the Southern Inter-Oceanic Highway between Peru and Brazil and the Northern Corridor Highway in Bolivia. The Inter-Oceanic Highway would be the first paved roadway connecting the Atlantic and Pacific oceans in South America and would provide new access to millions of hectares of intact tropical forests and indigenous territories for the first time. Both road projects spurred great controversy over fear that new access would fuel uncontrolled colonization, mining, deforestation, land invasion and speculation, wildlife trafficking and hunting. In retrospect, these fears proved prescient, as the new roads and subsequent colonization led to significant environmental degradation and social conflict in some parts of the corridor.

The Phase I consolidation strategy aimed to address high priority needs specifically targeting eight protected areas within the Tambopata - Pilón Lajas Conservation Corridor between Peru and Bolivia that were the most vulnerable to the new threats introduced by the new roads. With an allocation of US$2.185 million, CEPF funded four mutually-reinforcing investment priorities:

1. Support civil society participation in development planning and implementation for the Vilcabamba-Amboró Conservation Corridor, focusing on the Southern Inter-Oceanic and Northern Corridor highways.
2. Support management improvements to mitigate the adverse impacts arising from improved road access in the eight most vulnerable protected areas.
3. Support the establishment of sustainable financing mechanisms.
4. Support productive projects that maintain forest cover in areas of strategic value for corridor-level connectivity.

Over the 12-year period of 2001 to 2013 of Phase I, CEPF approved 67 projects totaling US$8.135 million. Mid-term and final assessments revealed that partners recognized that CEPF's contributions that brought new areas under formal protection and strengthened existing protected areas were major accomplishments. Local partners were genuinely enthusiastic about gaining a regional perspective and shaping their conservation and development programs around a more integrated, landscape-scale strategies. Prior to CEPF, conservation was tackled largely through isolated initiatives and collaboration was generally weak. CEPF's presence stimulated collaboration among major stakeholders, both government agencies and civil society organizations, bringing local and international missions and perspectives to the table.

Results demonstrated strong value-for-money and conservation results of global impact:

- More than 4.4 million hectares came under new protection with the declaration of nine new national parks, indigenous reserves, private protected areas, and Brazil nut concessions. Seventeen existing protected areas covering 9.9 million hectares came under improved management through the development of management plans, establishment of management committees, strengthened park management capacity, and improved infrastructure and equipment. These improvements allowed the core areas of five protected areas covering 4.4 million hectares to remain intact, withstanding threats from gold mining, agricultural encroachment, and logging.
- Livelihoods projects, though eco-tourism, sustainable Brazil nuts gathering, micro-enterprise development and sustainable coffee and cocoa projects reached 8,000 indigenous and mestizo communities while offering incentives to maintain biodiversity. CEPF helped 130 Brazil nut gatherers to obtain land title and to sustainably manage 225,000 hectares of forest, vital for landscape connectivity, through grassroots livelihoods projects compatible with biodiversity conservation.
- Eleven multi-stakeholder alliances were established and/or strengthened, including alliances to monitor the construction of the two highways, support improved protected areas management, and undertake regional-level REDD+ policy development.
- Civil society influenced eight policies and projects related to highway development, dam planning, gold mining, private protected areas, sustainable financing, logging

concessions, and REDD+. Community and stakeholder engagement offered new approaches to engage local people in road development projects.

- Development of new protocols that laid the basis for the declaration of Peru's first private conservation areas, which led to the country's robust private protected network to this day.

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 expand its geographic coverage.

3.2 CEPF Investment Phase II (2015 – 2021)

Based on the hotspot's strong performance and continuing threats and needs, CEPF donors selected the Tropical Andes in 2014 for a new investment phase. CEPF selected NatureServe in partnership with EcoDecisión to prepare the updated ecosystem profile. Eight stakeholder consultations in the seven hotspot countries allowed more than 200 experts to provide input into the ecosystem profiling process. The ecosystem profile was CEPF's first profile in South America to support the identification and adoption of KBAs to determine site priorities. In total, the profiling process resulted in the identification of 442 KBAs and 814 globally threatened species. To complement the KBA definition process, the profiling team also examined other parameters critical to advancing the conservation agenda, such as the need to work with local governments and the private sector, support for local environmental and indigenous CSOs, and opportunities to address major threats. Based on this consultative process, the CEPF Donor Council approved the ecosystem profile in March 2015. The CEPF investment started in July 2015 with the recruitment of the RIT, which issued the first call for proposals in October 2015.

The CEPF investment niche called for building the capacity of indigenous, mestizo, and environmental civil society groups to implement multi-stakeholder approaches that promote biodiversity conservation and sustainable development. The investment strategy targeted 36 KBAs covering 3.6 million hectares with exceptionally high biological diversity. These KBAs were clustered in seven conservation corridors in Bolivia, Colombia, Ecuador, and Peru. CEPF donors granted a US$10-million spending authority to implement seven strategic directions:

1. Improve protection and management of 36 priority KBAs to create and maintain local support for conservation and to mitigate key threats.
2. Mainstream biodiversity conservation into public policies and development plans in seven corridors to support sustainable.
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.
4. Promote and scale up opportunities to foster private sector approaches for biodiversity conservation to benefit priority KBAs in the seven corridors.
5. Safeguard globally threatened species.
6. Strengthen civil society capacity, stakeholder alliances and communications to achieve CEPF conservation outcomes, focusing on indigenous, Afro-descendant and mestizo groups.
7. Provide strategic leadership and effective coordination of CEPF investment through a regional implementation team.

3.2.1 Overview of Phase II Portfolio

To support the achievement of Phase II conservation outcomes and grant making, CEPF worked with a three-member consortium comprised of two national environmental funds and a regional NGO as the Tropical Andes Regional Implementation Team (RIT): the Fund for the Promotion of Peru's Natural Protected Areas (PROFONANPE) in Peru, the Natural Heritage Biodiversity Fund and Protected Areas (Patrimonio Natural) in Colombia and Bolivia, and the Latin American Future Foundation (FFLA) in Ecuador. A team of eight professionals worked together to undertake RIT's core responsibilities in their respective countries and at a regional level. These core functions are to build capacity of CEPF civil society partners, manage the small grants mechanism, facilitate large grants calls and monitoring, support portfolio-level communications, and conduct donor and government outreach.

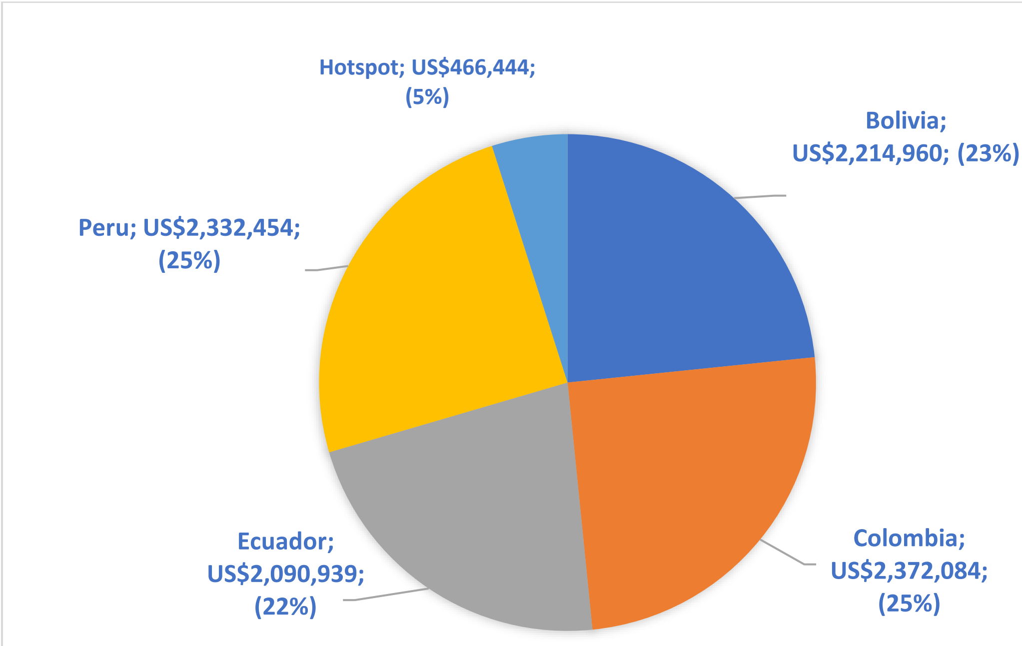
Table 3.1 shows CEPF funded 100 small and large grants totaling US$9,476,879 in Bolivia, Colombia, Ecuador, and Peru. Funding obligations were highest for grants under Strategic Direction 1 dedicated to KBA-level conservation, followed by grants dedicated to safeguarding globally threatened species under Strategic Direction 5. While strengthening capacities of civil society under Strategic Direction 6 received the lowest direct allocation, it is noteworthy that capacity building and organizational development were integrated as a cross-cutting priority across the entire portfolio. Eighty grants supported capacity building activities and deliverables, and as described below, important results emerged.

Table 3.1 Phase II Grants Awarded from 2015 – 2021

Strategic Direction	Awarded Grants			Total Grants Awarded
	Total Value (US$)	No. of Large Grants	No. of Small Grants	
1. KBAs strengthening	3,840,432	30	2	32
2. Mainstreaming biodiversity	784,821	8	3	11
3. Mitigation of key threats	611,287	4	0	4
4. Private sector support	800,907	9	4	13
5. Species conservation	1,345,067	13	7	20
6. Civil society strengthening	586,834	2	13	15
7. Regional Implementation Team	1,507,532	5	0	5
Total	**9,476,879**	**71**	**29**	**100**

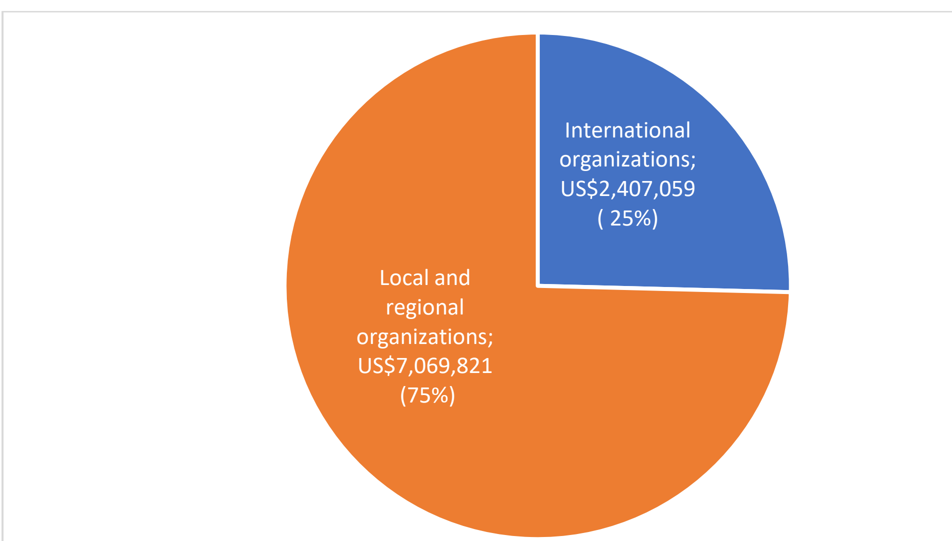
Figure 3.1 shows that CEPF allocated grant funding relatively evenly across the four countries, and that about five percent of funding was allocated to regional projects benefiting all four countries.

Figure 3.1 CEPF Investments by Country, 2015 – 2021



Andean-based organizations featured prominently as grant recipients. Of the 65 organizations receiving CEPF funding, 55 groups were locally based organizations. Figure 3.2 shows that Andean organizations received 75 percent of the funding and international groups with longstanding presence in the hotspot received 25 percent of the funding.

Figure 3.2 CEPF Grant Funding Allocated to Local verses International Organizations, 2015 - 2021



3.2.2 Summary of Results

The Phase II investment portfolio resulted in impacts on KBA and species conservation and civil society capacity building, as summarized in Table 3.2 and the following text.

Table 3.2 Phase II Portfolio Achievements

Portfolio Objective: Engage civil society in the conservation of globally threatened biodiversity through targeted investments with maximum impact on the highest conservation and ecosystem services priorities	
Target	**Achievement**
36 KBAs covering 3,399,016 hectares have new or strengthened protection and management.	2.9 million under improved management. Of this amount, 1.3 million are located within 26 KBAs and 1.6 million are in KBA buffer zones and biological corridors. A total of 26 new protected areas were established covering 763,901 hectares. CEPF invested in 32 KBAs covering 2,661,642 hectares. Investments benefitted 59,861people in 294 communities.
Subnational governments in seven corridors adopt and implement tools for mainstreaming biodiversity conservation into their land-use and development plans.	Subnational governments in six conservation corridors mainstreamed biodiversity conservation in their land-use and development plans, establish new conservation areas and biological corridors, conserve vital watersheds, formal establishment of water committees and funds.
Eight indigenous and/or Afro-descendant territories and their communities under improved land management and governance.	Nine indigenous groups (Tsimané-Mosetene, Aymara, Awa, Quechuas, Embera, Shuar, Chachi, Awajún, and Queros) developed new tools and capacities resulting in improved protection and management of their territories. Results included preparation and approval of Planes de Vida (life plans) incorporating biodiversity and climate change objectives, COVID-19 support, strengthened mechanisms for collaborative decision making, upgraded project management and communications capacity, and capacity strengthening for sustainable land management and monitoring, including documentation of traditional knowledge.
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.	100 networks and partnerships between civil society, government and the private sector created and/or strengthened, in such areas as ecotourism, species and site conservation, women's empowerment, water user associations, and sustainable mining.
At least 50 civil society organizations, including at least 45 domestic organizations, actively participate in conservation programs guided by the ecosystem profile.	65 civil society organizations (55 local and national NGOs and 10 international NGOs) participate directly and benefit from CEPF support in achievement of conservation outcomes.
At least three private sector businesses mainstream biodiversity and ecosystem services, with a focus on infrastructure, mining, and agriculture.	Three mining cooperatives in Bolivia adopt social and environmental best practices to prevent environmental degradation in 3 KBAs.

Conservation attention focused on at least 25 globally endangered species to improve their threat status.	73 IUCN globally Endangered and Critically Endangered species received direct conservation attention, with actions including development and implementation of species conservation plans; incorporation of species conservation in protected areas management plans; species assessments and inventories; and environmental education. Another 213 species also received direct benefits, and 74 species new to science identified, totalling 360 species supported through CEPF projects.
Three financing mechanisms or programs integrate biodiversity conservation and priority KBAs into their programming	Seven sustainable financing mechanisms established, including an environmental services compensation agreement in Colombia and three municipal water funds that benefit KBA management in Bolivia.
Tropical Andes ecosystem profile influences and complements other donors' investment strategies.	CEPF's investments influenced and complemented strategies with local and regional governments, national ministries, the private sector, and donors (GEF small grants program, Andes Amazon Fund, Rainforest Trust, Global Wildlife Trust, and the Moore Foundation).

3.2.3 KBA New Protection and Management Improvements

The cornerstone of CEPF grant-making focused on achieving site-based conservation improvements in 36 priority KBAs. In total, CEPF supported conservation activities in 32 KBAs covering 2,661,642 hectares. Phase II ended with management improvements and the declaration of new protected areas in 2.9 million hectares, of which 1.6 million hectares were located within 26 priority KBAs and 1.3 million hectares were in their buffer zones or biological corridors. CEPF estimates that 59,861 people living in 294 communities across the far reaches of the hotspot, some located in very remote areas, derived direct benefits from these improvements. Fifty-three percent of these beneficiaries were men, and 47 percent were women.

KBA improvements were achieved through a full gamut of actions, including approval of new or updated protected area management plans, development of new management plans for community participation in KBA management, agroforestry projects that prevented encroachment into core conservation areas and that restored degraded land. Projects generated livelihoods from coffee, cacao, and ecotourism, and payments for ecosystems services provided communities with economic incentives for conservation. In addition, environmental awareness projects permeated the portfolio with excellent results.

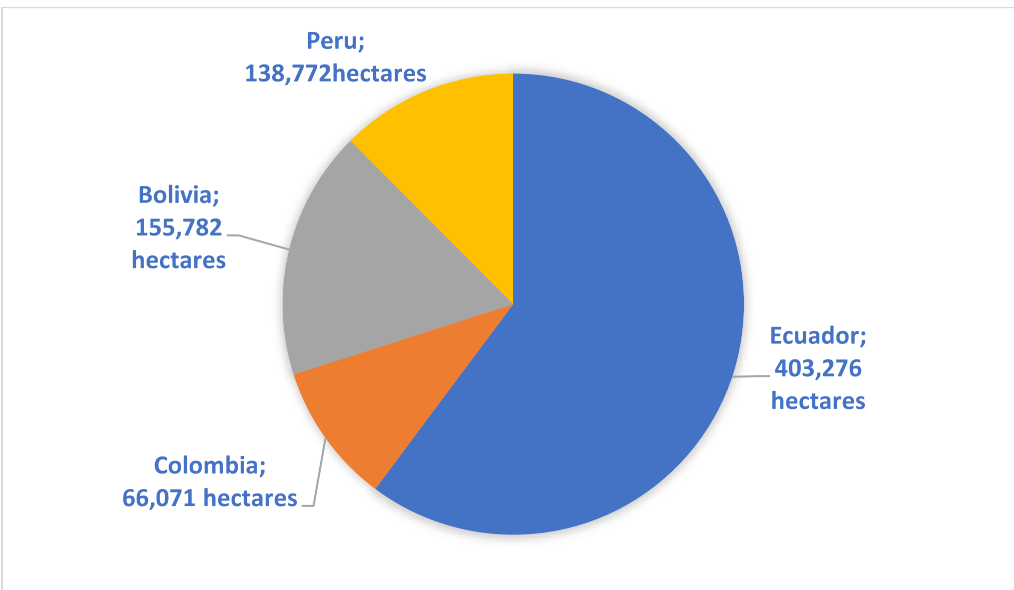
Several projects highlight CEPF's contributions to improve KBA management. In Bolivia, the Tsimané Mosetene Regional Council (CRTM) prepared a management plan and *plan de vida*[1] (life plan) for Pilón Lajas Biosphere Reserve. The project was considered to be groundbreaking because it represented the first time in Bolivia that leadership for updating of a national protected area management plan rested with a local indigenous organization. The conservation of Serranía El Pinche KBA in Colombia became a vehicle for bringing together former combatants when the Fundacion Ecohabitats conducted environmental education, ecological restoration, and bird watching training as an alternative livelihood to coca cultivation. And in Ecuador,

[1] A Plan de Vid*a* is a tool used by indigenous communities throughout the hotspot to support participatory needs assessments and community development strategies to fulfill local community cosmovisions.

Conservation International supported a new model for management planning based on a consultative approach to develop the management plan for Cotacachi-Cayapas Ecological Reserve. The data that were compiled by CI helped the environment ministry to upgrade KBA's protection status to a full national park.

Several Phase II performance targets were exceeded. For example, CEPF grantees helped get 26 new protected areas covering 763,901 hectares declared and gazetted, exceeding the target of 220,000 hectares. Figure 3.3 shows the that new protected areas in Ecuador accounted for 53 percent of total at 403,276 hectares. Most new protected areas were declared by sub-national governments and were often linked to the conservation of watersheds, such as in the case of the 108,959-hectare Íntag Toisán ACUS in Ecuador and the 6,212-hectare Reserva de Agua y Conservación de Ecosistemas Montanos – Río Negro in Bolivia. CEPF grantee La Planada provided technical assistance to Awa indigenous authorities and to leverage new funding that resulted in the declaration of the 2,000-hectare Reserva Natural de la Vida Awá - Hector García in Colombia. CEPF also helped land come under national protection status, such as in the case of the 33,697-hectare Parque Nacional Río Negro Sopladora in Ecuador.

Figure 3.3: Land Under New Protection in Phase II



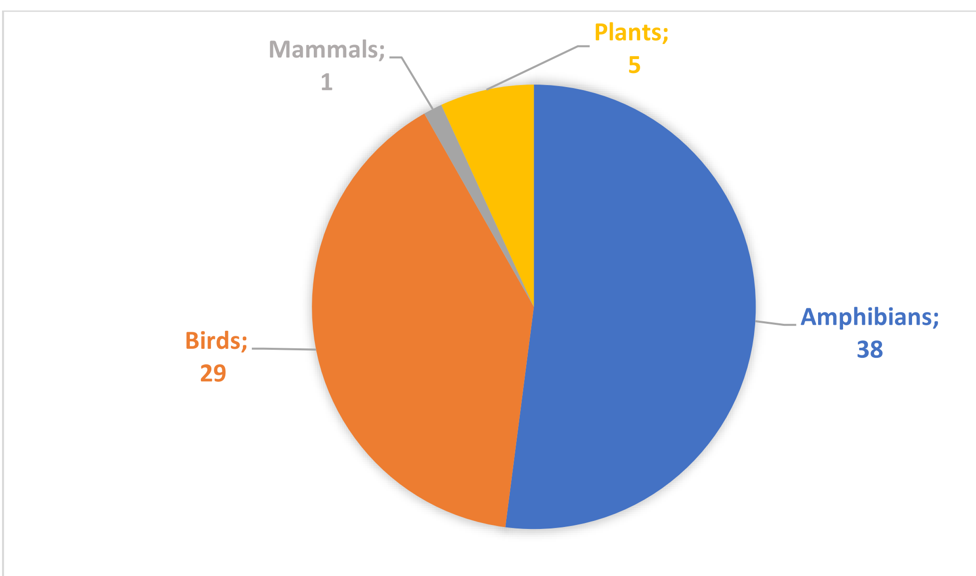
In addition, CEPF improved management of 205,604 hectares of productive landscapes, exceeding the 100,000-hectare target. Such projects linked to conservation incentives and small business ventures, such as ecotourism, sustainable coffee, payments for ecosystem services and conservation agreements. For example, in Peru, the company Shiwi worked closely with the honey and sugar producers of the private reserve network, Red de Conservación Voluntaria de Amazonas (RED AMA) and Sociedad Peruana de Derecho Ambiental (SPDA) to develop and implement a business and marketing plan for these sustainably produced products. The effort helped to improve sales by 99 percent for local producers, leading to a 46 percent increase in revenues. With RED AMA and SPDA, an ecotourism development plan was developed and implemented, and new tourism routes designed and promoted for private protected areas and areas of high cultural value. Hospitality training increased the capacity of 95 men and women, to the point that tourism increased by a factor of six.

3.2.4 Safeguarding Threatened Species

Species conservation also figured prominently in Phase II. Figure 3.4 shows that 73 Critically Endangered (CR) or Endangered (EN) species benefitted directly from CEPF funding, exceeding the target of 25 species, through development and implementation of species conservation action plans, integration of species conservation into protected areas management plans, and field work to assess species presence, population status, habitats and breeding. Grantees estimate that another 213 species also benefited from CEPF projects through field research and species conservation plans. CEPF partners registered an astounding 74 new species to science, which resulted in scientific publications for 23 species. I total, CEPF projects directly supported 360 species. Furthermore, CEPF funded the first Red Listing of the Tropical Andes plants, enabling the listing of 614 species of the hotspot's most emblematic plants on the global conservation agenda.

Species action plans translated into direct community mobilization. For example, Aves y Conservación established a community women's group to reforest degraded land with trees that provide habitat for the Critically Endangered Black-breasted Puffleg (*Eriocnemis nigrivestis).* The Universidad Técnica Particular de Loja in Ecuador identified an impressive 27 amphibians species in Abra de Zamora KBA, 12 species believed to be new to science. The findings led the Municipality of Loja to designate the site as a municipal reserve.

Figure 3.4. Number of CR and EN Species by Taxa Benefiting Directly in Phase II, (Total = 73 species)

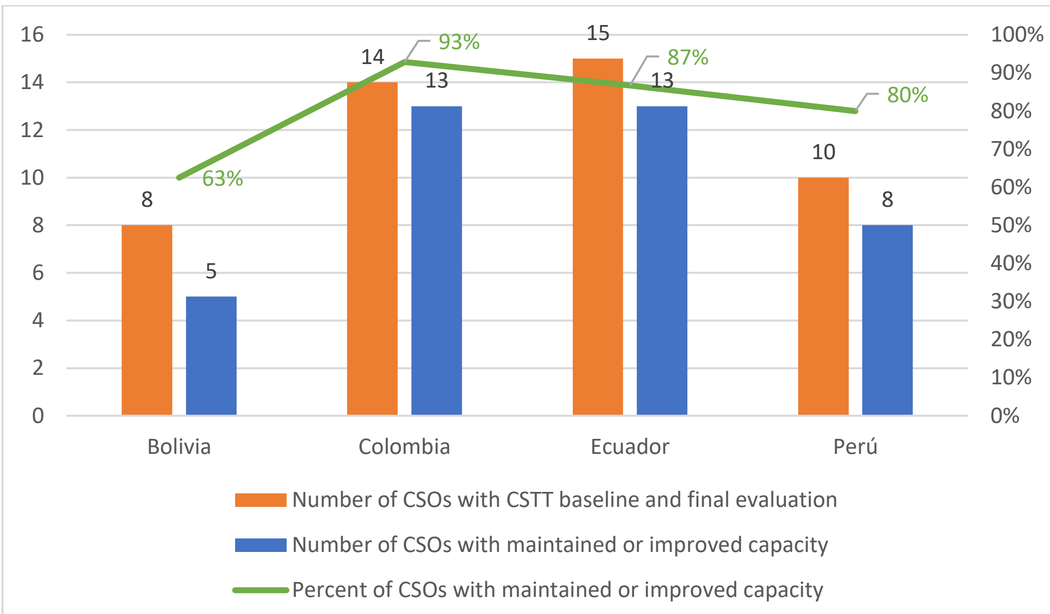


3.2.5 Civil Society Capacity Building

CEPF funded 65 organizations either directly or as sub-grantees, of which 55 groups were Andean based and 10 groups were international organizations with longstanding presence in the hotspot. Reflecting Phase II's strong focus on institutional strengthening and capacity building, 80 percent of all grants included at least one or more deliverables related to organizational development, capacity building and/or alliance building of one or more local institutions. CEPF supported development of organizational strategic plans, fundraising plans and financial manuals, communication strategies, upgraded websites and financial systems, to name a few of these activities.

To monitor the results of its capacity building investments, CEPF required local organizations to complete the Civil Society Capacity Tracking Tool (CSTT) at the beginning and end of CEPF support. Figure 3.5 shows that of the 47 local organizations that completed the CSTT, 39 institutions (83 percent) reported at least maintaining or increasing their CSTT score over the period of CEPF support. Eight organizations (17 percent) report a decrease in their CSTT score.

Figure 3.5. Grantees with Maintained and/or Increased Institutional Capacity



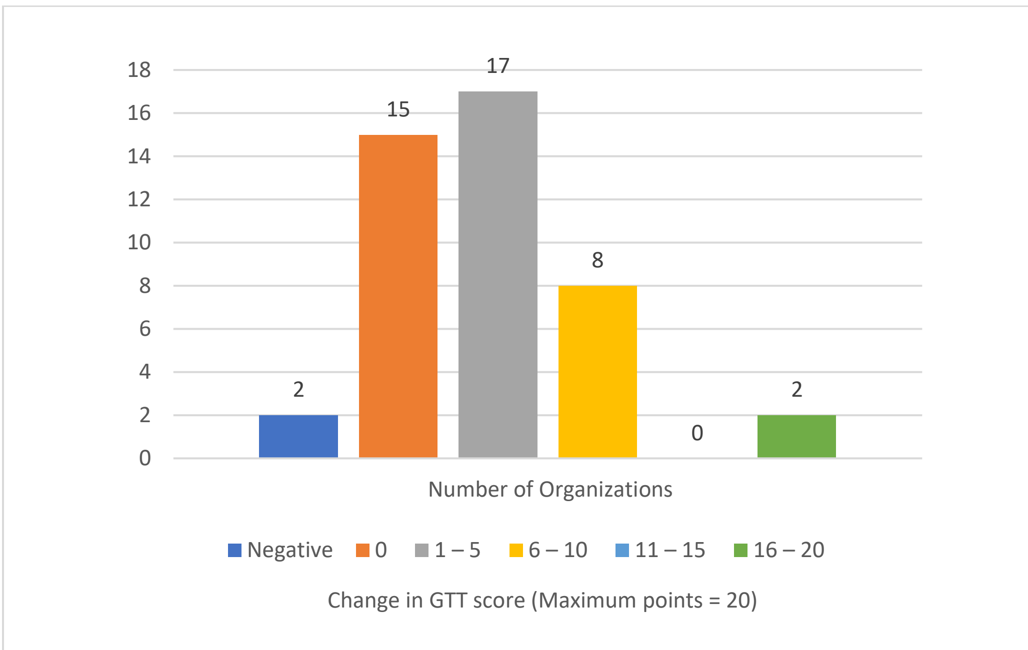
A total of 10,117 people received formal training, which focused on project and financial management and on technical areas. Furthermore, the RIT organized grantee exchanges to facilitate learning between organizations. RIT and CEPF mentoring of grantees in a variety of subjects related to project design and management also figured prominently.

Once COVID-19 entered the hotspot in early March 2020, CEPF helped grantees and local communities adapt to the lock-downs. CEPF covered costs related to promoting community understanding of COVID-19 prevention strategies, including the production of radio programs, printing of flyers and planned public health training workshops, in Spanish and local indigenous languages. Grantees purchased supplies and equipment for their offices to prevent the transmission of the virus and to help with food supplies and farming inputs for community to cover their need to produce food locally.

A small grant to Consultora BYOS and the Simón Bolívar Andean University funded a three-month virtual course in mid-2020, at the height of COVID-19 restrictions, to build capacity in project design and management. Demand to attend the course was high. More than 100 people from 52 organizations participated in the course, which provide to be a very well received approach to enhance project management capacity and to support fund raising at a time when most people were forced to work from home.

The unveiling of CEPF's gender policy in 2016, launch of the Gender Tracking Tool (GTT) in 2017 and publication of the Gender Toolkit in 2018 increased awareness and capacity of Andean grantees regarding the importance of integrating gender considerations into their own policies and practices. Figure 3.6 shows that of the 44 organizations that completed a baseline and final GTT assessment, 27 organizations (61 percent) experienced an improvement of at least one point on the 20-point scale. Seventeen grantees experienced improvement between one to five points, although ten groups demonstrated more significant improvements from six to twenty points.

Figure 3.6. Grantees with Maintained and/or Increased Capacity for Integrating Gender in Organizational Policies and Practices



3.2.6 Alliance Building and Multi-sectoral Partnerships

CEPF supported the establishment and/or strengthening of 100 local, national and regional alliances to foster collaboration on a variety of conservation objectives. Many alliances were dedicated to supporting local conservation efforts. For example, at CEPF's encouragement, nine local organizations formed the Bosque de San Antonio round table in Colombia which resulted in a joint effort to develop and implement the strategic plan and sustainable management plan that CEPF helped to fund and that leveraged additional resources for implementation. Preparation and implementation of an ecotourism strategy for Kosñipata-Carabaya KBA in Peru led by the Frankfurt Zoological Society resulted in 52 ecotourism operators establishing a formal association to strengthen their services and marketing efforts. In Bolivia, the Wildlife Conservation Society (WCS) efforts to reduce the impacts of mining in three protected areas located in the Madidi-Pilón Lajas-Cotapata Corridor led to the establishment of the Inter-Institutional Working Group on Mining, comprised of 14 organizations working together to generate information, awareness and improved policies to promote better environmental and social practices for mining in Bolivia. WCS's expertise in sustainable mining served as the basis for creating an alliance of conservation groups across the four CEPF priority countries to develop a regional mining strategy in the priority corridors.

Other alliances brought CEPF grantees together based on the geographic clustering of CEPF grants. For example, grantees in Colombia started working together early in Phase II to collaborate on implementing their CEPF grants, to sponsor joint capacity building activities, to share their communications and conservation products and to undertake site visits to exchange lessons learned and best practices. Collaboration also occurred frequently between Ecuadorian and Colombian grantees along the bi-national border area. In Bolivia, a project dedicated to building environmental communications capacity brought CEPF Bolivian grantees together to reinforce their capacity in communications. These alliances helped grantees take advantage of different experiences and capacities available within the CEPF partnership, therefore creating efficiencies and optimizing the impacts of various grants.

Taken together, the achievements of Phase I and II in Tropical Andes contributed to 12 of the 20 Aichi Biodiversity Targets of the Convention on Biological Diversity's (CBD's) Strategic Plan for Biodiversity 2011-2020.

3.3 Lessons Learned from Participatory Assessments

3.3.1 Lessons Learned from Phase I (2001 – 2013)

CEPF Phase I investment in the Tropical Andes established an immensely important foundation for conservation in a 30-million hectares corridor in Peru and Bolivia where conservation actions were nascent and operated in isolation of one another. New legal protection of over 4.4 million hectares and improved management of 9.9 million hectares lay testament to the highly favorable operating environment for conservation in the hotspot in the 2000s. Phase I led to significant conservation impacts that remain to this day. The new capacities, policies and conservation tools endure, though the great threats described in Chapter 6 remain.

Lessons learned from Phase I were obtained through several assessments workshops with grantees and were incorporated into the 2015 ecosystem profile, with the aim of consolidating and amplifying successful models into new sites and corridors, to expand CEPF funding as well into Colombia and Ecuador. Highlights of the lessons learned in Phase I are as follows.

- Phase I investments laid a critically important foundation for conservation in an enormous corridor that harbored areas of high biological and cultural value. The declaration of new protected areas and strengthening of existing sites were critical advances within an overall strategy to safeguard some of the largest and best-preserved sites within the hotspot from immediate threats. The advances, however, required reinforcement to ensure they could be sustained over the long term. CEPF partners recognized that priority sites remained highly vulnerable to development policies that encouraged new colonization, agricultural conversion and mining. Continental-scale development projects in the way of construction of new frontier roads, dams and major water diversion schemes, and the awarding of mining concessions with weak environmental and social oversight, posed existential threats to these sites and their rich biodiversity and cultures. CEPF partners therefore urged the need to reinforce the important foundation that was laid in Phase I.

- Partners highlighted the critical role of strengthening civil society in the hotspot at two levels. At the grassroots level, partners urged CEPF to focus on building coalitions and alliances to further engage local environmental, campesino and indigenous civil society groups. They advised building the capacity of Andean CSOs to support their role as the long-term stewards and managers of these important sites. At the policy level, partners urged forging collaboration with sub-national governments, because decision-making authority for natural resources management was in the process of being decentralized to local governments, which often lack basic capacity or funding to fulfill their new responsibilities. CSOs technical knowledge and experience could help to mainstream biodiversity and ecosystem services into local and regional policy frameworks and projects.
- CEPF's investments strengthen existing conservation initiatives, supported new ones and generated a wealth of experience and innovative tools. Stakeholders recommended that these experiences and tools be replicated in other parts of the hotspot where CEPF's unique support to CSOs was vitally needed to tackle existing and emerging conservation challenges.
- The ecosystem profile, and particularly the focused nature of the investment strategy, was an innovation for grant making in the hotspot that stakeholders viewed as a major strength. Partners recommended that CEPF adopt targeted conservation outcomes and indicators in future investment strategies.
- Because conservation funding for threatened species was very scarce, participants recommended expanding CEPF's investment strategy to include species conservation.

3.3.2 Lessons Learned from Phase II (2015 – 2021)

CEPF conducted two formal assessments in Phase II. In March 2019, 88 participants representing grantees, governmental partners, donors, the RIT, members of advisory committees, and the Secretariat met in Quito for three days. Together they reviewed the progress achieved, identified key challenges, remaining gaps, and future priorities to guide grant-making for the duration of the investment period. In January 2021, more than 150 people met virtually for the final assessment to discuss the key achievements, challenges encountered, lessons learned and recommendations for future grant making in the hotspot. Highlights of the conclusions and lessons learned from these meetings are as follows.

Based on these assessments, Andean civil society community members expressed their enthusiastic support for CEPF in the hotspot. Grantees agreed that the Phase II portfolio elevated CEPF's investments to a new level by supporting conservation actions across seven conservation corridors in 32 KBAs in four countries and in new thematic areas. CEPF made a concerted effort to target support to Andean-based environmental and indigenous CSOs, to solidify grassroots and regional conservation capacity, in sites where conservation funding was often scarce and even non-existent. The portfolio raised awareness for globally threatened species and KBAs that previously were not on anyone's conservation agenda. CEPF helped cultivate multi-sectoral alliances involving CSOs, communities, local governments, small private enterprises and indigenous communities to develop and implement well aligned and coordinated conservation and development agendas. Support to indigenous communities resulted in their strengthened capacities and innovative governance models that put indigenous communities in leadership roles for conservation planning and implementation.

While CEPF helped to achieve a great deal and to generated excellent momentum in Phase II, unprecedented challenges that impacted the portfolio profoundly where encountered. Two challenges in particular shaped the portfolio in unexpected ways.

First, CEPF's initial optimism brought about by the historic 2016 peace accords in Colombia soon vanished as security concerns involving violent groups who put environmentalists and indigenous leaders (including CEPF grantees) in danger, soon emerged. While the violence was the worst in Colombia, grantees in Peru and Ecuador also reported threats that put them in peril. As an immediate result of the security concerns, CEPF refrained from investing in two large KBAs, Sierra Nevada de Santa Marta and Munchique Sur. In addition, CEPF and the RIT worked with several grantees on risk-reduction strategies, that included improvements in equipment for communications and territorial monitoring. CEPF funded an overall strategy to reduce risk for Colombian environmental and indigenous defenders, and helped establish a coalition of Colombian groups dedicated to supporting at risk environmental and indigenous defenders. By the end of Phase II, these investments paid dividends: security improved in some sites, thereby reducing immediate risks to CEPF grantees and communities.

The second challenge reflected the significant disruptions caused by COVID-19 throughout the hotspot, as described in this profile. For CEPF grantees, field visits, meetings and consultations stopped abruptly in March 2020 for the remainder of the portfolio and left pending deliverables incomplete. In Bolivia, for example, ACEAA postponed final community consultations required to secure community approval of the Cotapata National Park management plan, an effort started in 2018. Pronaturaleza suspended implementation of the last steps required to obtain formal protection of Kosñipata-Carabaya KBAs in Peru, a goal started in 2017. And Asociación Armonia halted scheduled site visits to indigenous communities, which were required to develop a bird tourism strategy for the Madidi-Cotapata-Pilon Lajas Conservation Corridor.

CEPF and partners were, therefore, forced to reconfigure their grants, extend deadlines and/or provide emergency support to local communities who went into strict lockdowns or who lacked access to basic information on how to prevent the transmission of COVID-19 in their local indigenous language, as summarized in an article on CEPF's website https://www.cepf.net/stories/conservation-time-covid-19.

Despite the challenges, Andean CSOs demonstrated remarkable flexibility, creativity, and resilience. By working from their homes and conducting meetings virtually, several grantees made important advances. Nature and Culture International (NCI), for example, worked remotely with Ecuador's environment and water ministry to draft guidelines that legally established the Sangay Podocarpus Biological Conservation Corridor in July 2020, a 566,000-hectare biological corridor that connects Sangay National Park in central Ecuador with Podocarpus National Park in the south. CEPF and the RIT also worked from remote locations. Even the final assessment for Phase II was conducted virtually, enabling 150 people from six countries to participate.

While the Andean conservation community learned to work remotely to the extent possible, the crisis also revealed the fragility of many Andean NGOs. The lack of unrestricted funds and heavy dependence on international donors to cover staff salaries and operating costs meant any slowdown of conservation funding would have significant impacts on the welfare of conservationists and conservation NGOs. Travel restrictions also meant that conservation NGOs became cut off from their partner communities and sites that often lacked access to communications infraestructure. Some CEPF partners expressed concern about the possible backsliding of hard-won conservation gains due to the pandemic.

CEPF's experience has yielded several lessons learned that have important implications for Phase III investments:

- Despite the threats in Colombia, a key lesson learned was that local environmental and indigenous CSOs remained well positioned to continue working with communities on conservation and sustainable development activities. Communities viewed CEPF grantees positively as allies helping to improve their quality of life. Some projects brought former enemies together to achieve common conservation goals. Colombian grantees forged close ties and collaborated on implementing their projects and helped CEPF's strategy to support local community groups proved successful in working in areas that confronted episodic conflicts.
- COVID-19 and the economic downswing exposed the vulnerable state of finances for conservation in the Tropical Andes. Several national environmental ministries encountered significant budget and staffing cuts, making the role of civil society organizations ever more important to lead environmental and sustainable development efforts throughout the hotspot. Civil society organizations remained highly dependent on a limited number of donors, including on CEPF. A lesson learned is that CSOs concerned with conservation need to diversify their funding sources beyond governmental budget allocations and international donors, to more stable and longer-term financing mechanisms that can tap into other funding streams, particularly those based on payments for ecosystem services and nature climate solutions. CEPF stands in a good position to help CSOs undergo this transformation.
- Phase II demonstrated that Andean civil society groups generally lack experience and capacity to work with private sector companies. While opportunities may exist for working on corporate social responsibility, Andean environmental groups demonstrated limited experience in engaging with the private sector beyond small and medium sized businesses. Given the critical role that the private sector plays in influencing the course of development in the hotspot, CEPF should reach out to new partners with experience and capacity to work with local CSOs and the private sector to advance conservation in the hotspot.
- Partners recognize that the Andean operating environment is complex, and the scale of the hotspot's needs and challenges is immense. CEPF helped lay a solid foundation for establishing new protected areas, and for piloting projects that linked sustainable livelihoods and conservation. To promote the sustainability of CEPF-funded initiatives, more focus needs to be devoted to institutionalize conservation plans and actions within the policies and programs of local governments, other donors and the private sector.

3.3.3 Independent Evaluation of Lessons Learned by the RIT in Phase II

CEPF commissioned an independent evaluation on the RIT from November 2020 to March 2021 led by the consultant Hugo Arnal. The purpose of the evaluation was to inform the selection of an RIT for the next phase of investment by evaluating the performance of the incumbent RIT organizations; review the benefits the design of future RIT proposals through the lessons learned from this evaluation regarding the programmatic and management approaches of the incumbent RIT organizations; and inform the preparation of the update to the ecosystem profile by documenting the challenges and opportunities encountered by the RIT. The evaluation methodology consisted of desk research and virtual interviews with 57 people representing 37 CEPF partner organizations, RIT staff and members of the CEPF Secretariat. The evaluation report provided an analysis of the performance and challenges encountered in each of the four countries that CEPF supported in Phase II.

The evaluation report states its most important finding to be a reconfirmation of the importance of the work promoted and supported by CEPF and the RIT. The report notes that CEPF is considered among the most relevant funding facilities for conservation and civil society in the hotspot, and partners value highly the support CEPF and RIT staff. Overall, the RIT evaluation finds the performance of the RIT to be excellent. Efforts undertaken to overcome several performance limitations described below and to strengthen stakeholder coordination and local capacity were highly praised. Also, the capacity of the CEPF Secretariat to work and coordinate with three different organizations forming the Tropical Andes RIT was recognized.

The evaluation identified several performance factors relevant to CEPF's investment strategy:

- *Security Threats in Colombia*. As mention previously, CEPF was not able to invest in two KBAs, Sierra Nevada de Santa Marta and South Munchique, due to security threats posed by armed groups. The evaluation noted that more than 450 environmental activists and human right defenders had been killed since January 2016 in Colombia, including more than 121 indigenous leaders since August 2018. Assassinations to Colombian environmental and indigenous leaders was the worst in the world in 2019.
- *Political unrest in Bolivia, Ecuador and Peru.* The evaluation noted significant performance factors related to episodic rioting and nationwide strikes in 2019 and 2020, which brought virtually all activities in these countries to a standstill and impacted local and national economies significantly. In Bolivia in October 2019, charges of election fraud in presidential elections caused five weeks of violent clashes. New strikes arose as well in August 2020. Also, in October 2019, activities were suspended in Ecuador for several weeks when widespread strikes broke out in opposition to the president's attempt to eliminate subsidies on fossil fuels. Since 2018, Peru has been embroiled in a broad-based corrupt scheme stemming from the bribery of high-level officials by the giant Brazilian construction firm Odebrecht (which built the Inter-Oceanic Sur highway mentioned previously in this chapter). Scandals plagued four of the country's presidents since 2018 and helped to trigger in November 2020 the strongest protests in the country in more than two decades.

  This political turmoil in three of the four priority countries exacted a heavy toll on the national economies and their executive branches. Environmental ministries and parks management agencies were significantly weakened by frequent management changes, major budget cuts and high staff turnover, particularly in Ecuador and Bolivia. The staff turnover at the environmental ministries hampered CEPF's ability to coordinate closely with the government, including in some protected areas.

- *COVID-19 Pandemic.* The pandemic profoundly impacted the Tropical Andes Hotspot, inclusive of the hotspot's conservation and development NGOs, as described in Chapter 6. A survey of CEPF grantees in the hotspot found that over 80 percent of respondents canceled up to 25 percent of their deliverables. Nearly 90 percent of respondents observed an increase in the economic vulnerability of local community, and 50 percent experienced a drop in their own conservation activities. More than half the partners reported a reduction of governmental capacity to manage their protected areas and natural resources.

The RIT evaluation identifies 35 lessons learned and recommendations which the profiling team reviewed and integrated into the Phase III investment strategy, several of which are highlighted below:

1. Identify and appoint to serve as the RIT for Bolivia an organization with a longstanding in-country presence and demonstrated knowledge of the local environmental and socio-political context.
2. Building on demonstrated capacity, increase efforts to develop alliances and contribute to building better public policies.
3. Promote payments for ecological services schemes as means to support biodiversity conservation and local community livelihood.
4. Develop a public-access repository to the various reports and other products generated with CEPF support.
5. Through a bottom-up approach that engages partners, improve impact monitoring from CEPF investment, particularly with respect to species, community benefits and sites with improved management.
6. Through a bottom-up approach that engages partners, develop a communications strategy to raise environmental awareness for public, authorities and political leaders, and to demonstrate the collective power of the CEPF community.

The complete evaluation report can be found on CEPF's website: https://www.cepf.net/sites/default/files/tropical-andes-lessons-learned-2021.pdf.

3.3.4 Recommendations from the Long-term Vision Exercise

CEPF undertook a long-term vision (LTV) exercise for the Tropical Andes Hotspot between September 2020 and March 2021 through a consultancy with the UK-based firm Talking Transformation Ltd. The purpose of the long-term vision is to inform decision making about the duration and types of investments that CEPF needs to make over the next 20 years, in order to reach a point at which it can leave the hotspot with confidence that effective biodiversity conservation programs will continue in a self-sustaining manner. To this end the long-term vision defines specific criteria and targets related to the following five conditions:

1. Global conservation priorities and best practices for their management are documented, disseminated and used by public and private sector, civil society and donor agencies to guide their support for conservation in the region.
2. Local civil society groups (*i.e.*, national, sub-national and grassroots organizations) dedicated to global conservation priorities collectively possess sufficient organizational and technical capacity to be effective advocates for, and agents of, conservation and sustainable development, while being equal partners of private sector and government agencies influencing decision making in favor of sustainable societies and economies.
3. Adequate and continual financial resources are available to address conservation of global priorities.
4. Public policies, the capacity to implement them and private sector business practices are supportive of the conservation of global biodiversity.
5. Mechanisms exist to identify and respond to emerging conservation challenges.

In the Tropical Andes, the exercise entailed synthesis of secondary information and a series of workshops and interviews involving over 100 local stakeholders. The LTV exercise was coordinated with the preparation of this ecosystem profile. The participatory nature of the ecosystem profiling process and its in-depth data and situational analysis helped to contextualize the LTV analysis. The overlap of both planning efforts provided an opportunity for the ecosystem profiling team and the consultations to assume longer-term strategic thinking to orient the priorities of the Phase III investment strategy.

The LTV presents a theory of change for biodiversity conservation and for graduation from CEPF support to clarify those aspects of conservation over which civil society can have an influence. Given the importance and immense size of the hotspot and the scale of the threats it faces, the LTV team identified 13 priorities and corresponding targets that CEPF and other funders should support to achieve transformative change as envisioned for CEPF graduation. The LTV suggests a pathway for the hotspot's graduation from CEPF support in two stages between 2021 to 2040.

Stage one covers 2021 to 2030 and aims to enable CSOs to build their capacities individually and especially collectively through a broad range of alliances and regional networks. The LTV calls for CEPF to help address the severe financial problems that CSOs confront, which are highly debilitating at a time when society needs environmental CSOs the most. The LTV advocates that CEPF help CSOs access and effectively use funding from new financial flows mainly from climate change and the shift towards green development. The LTV advances the need for CSOs to develop new relationships with the business and finance sectors as well.

In addition, the LTV regards strengthened communications as essential to increase public support for conservation and for building CSO capacity and credibility to influence governments and industry. In parallel, the LTV recommends continuing efforts to address the immediate, critical threats to biodiversity in ways that contribute to larger transformational change to influence the environmental performance of key industries. The LTV recommends building a portfolio of field projects that includes co-created, landscape-scale and multi-actor projects involving biodiversity and ecosystem services-friendly productive activities by communities and businesses.

Recommendations from the long-term vision are incorporated into the ecosystem profile in the CEPF niche (Chapter 12) and investment strategy (Chapter 13). Because the investment strategy covers a five-year period, which is a shorter period than the long-term vision, not all recommendations are included in the investment strategy. The complete report on the long-term visit can be found on CEPF's website.

4 BIOLOGICAL IMPORTANCE OF THE HOTSPOT

4.1 Geography

The Andes Mountains are divided into the northern, central and southern ranges. These ranges are the result of tectonic processes that have taken place over several geological periods. The southern cordillera, located between Argentina and Chile, is the oldest, with its rise beginning approximately 50 million years ago during the Early Paleogene period. The northern and central cordilleras, known as the Tropical Andes, are relatively more recent, with uplift occurring 20 million to 25 million years ago during the Miocene and Pliocene epochs. They extend from western Venezuela and northern Colombia to the border between Bolivia, Argentina and Chile (Clappertone 1993; Josse *et al.* 2009; Cuesta *et al.* 2012b).

The Tropical Andes is located between latitudes 11°N and 27°S, covering an area that includes Venezuela, Colombia, Ecuador, Peru, Bolivia and the tropical portions of northern Argentina and Chile. It has not only a wide latitudinal range but tremendous altitudinal variation as well. The elevation of the Tropical Andes goes from 500 m to over 6,000 m above sea level, except for the northern part in Venezuela, where it reaches almost sea level. Its western border is marked by the eastern edge of the Tumbes-Chocó-Magdalena Hotspot and the arid ecoregion of the Atacama-Sechura Desert. The border of the Tropical Andes in this vast area rises to 1,000 m above sea level or even higher (Mittermeier *et al.* 2004). The Tropical Andes has extraordinary biological, geological, and climatic diversity. It is also culturally diverse. With nearly 10 million indigenous people belonging to dozens of different ethnic communities throughout the region, it can be considered the indigenous heartland of South America (Cuvi 2013).

The hotspot covers more than 158 million hectares, an area three times the size of Spain. Rugged peaks and wide valleys characterize the entire cordillera, along with steep slopes and deep ravines, some of which have elevation differences of several thousand meters, like the Colca Canyon in southern Peru. A vast high mountain plain, the altiplano, extends to altitudes above 3,500 m through much of southern Peru and western Bolivia. This geological complexity combines with different climates caused by steep altitudinal gradients to create a diversity of ecosystems. The tree line extends from 3,800 m to 4,500 m above sea level near the equator and above 4,500 m in the approach to the hotspot's southern boundary (CEPF 2015).
The topography of the Tropical Andes includes huge geological structures that influence air circulation and hydrological regimes throughout South America (Young 2012). The wide variety of ecological conditions, driven by differences in altitudes, microclimates and soil formation, generates multiple biophysical conditions and a very diverse biota rich in endemism or particularly restricted in distribution (Young 2012; Cuesta *et al.* 2012b; Weingend *et al.* 2005). Thus, the Tropical Andes contains the most extreme ranges of landscape types, climates, and plant communities in the world and is considered one of the richest and most biologically diverse regions on Earth (Myers et al. 2000; Mittermeier *et al.* 2011).

In the north, the hotspot begins in Venezuela with a chain of small geologically distinct mountains that border the northern coast of South America. The hotspot extends to the east and south at the northern end of the Andes range where two branches occur on Venezuela's border with Colombia, the Cordillera de Mérida and the Cordillera de Perijá. In Colombia, the Andes divide into three ranges that stem from a massif located at 2°N latitude and are separated by two valleys running from south to north. The Magdalena Valley separates the Cordillera Oriental from the Cordillera Central, and the Cauca Valley separates Cordillera Central and the Cordillera Occidental. The Cordillera Oriental, where the capital city of Bogota is located, is the broadest of the three ridges. The Cordillera Central is the highest of the three and contains several active volcanoes, some of which are partially covered by snow. The narrow and relatively low Cordillera Occidental borders the northern portion of the Tumbes-Chocó-Magdalena Hotspot. The Tropical Andes Hotspot includes the isolated Sierra Nevada de Santa Marta mountain range on Colombia's Caribbean coast. With its summit at 5,700 m elevation, this massif is the world's highest coastal mountain (CEPF 2015; Carvajalino 2018). Its geological origin is independent of, but contemporary to, the Andes.

From southern Colombia to latitude 3°S in Ecuador, the Andes comprise two parallel, north-south oriented mountain chains, the Cordillera Oriental and the Cordillera Occidental, that form a narrow (150-180 km wide) 600 km-long range (Clapperton 1993; Josse *et al.* 2012). The two cordilleras of the Ecuadorian Andes are joined by a series of inter-Andean valleys at elevations greater than 2,000 m above sea level (CEPF 2015).

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 Chinchipe River's confluence with the Marañon and Huancabamba Rivers, the Andes become lower in elevation and drier (Josse *et al.* 2009). The Porculla Pass, in the Huancabamba Depression (6°S, 2,145 m above sea level), defines the limit between the northern and southern portions of the Tropical Andes (Weingend 2004; Weingend *et al.* 2005). South of the department of Cajamarca in Peru, the Marañon Valley separates the Cordillera Central and the Cordillera Occidental. The Cordillera Central is continuous and lower than the Cordillera Occidental, where peaks reach higher than 6,000 m above sea level (CEPF 2015).

The two cordilleras converge near Lake Junin in central Peru. From here, south to La Paz, Bolivia, the Tropical Andes is continuous and high, with no mountain pass lower than 4,000 m above sea level. The Cordillera Oriental and Cordillera Occidental flank the altiplano of southern Peru and Bolivia. This area comprises wide, internally drained plains with large lake complexes.

The southern limit of the hotspot is in northern Argentina and northern Chile. It includes several isolated areas in a complex of cordilleras and valleys between 2,000 m and 4,000 m elevation. Here the hotspot borders the extremely arid Atacama Desert to the west and the Chaco woodlands to the east and south. To the south, the temperate forests of the Chilean Andes are considered a different hotspot, called the Chilean Winter Rainfall and Valdivian Forests.

The Tropical Andes Hotspot encompasses the headwaters of some of the world's most important river systems as well as notable lake and marsh environments. The western slopes of the Andes drain into the Pacific Ocean and the northern slopes into the Caribbean Sea. The eastern Andes drain into the Amazon, Orinoco and Paraguay rivers (Young 2012). Most of the seasonal water flow variations and water chemistry of the Amazon and its tributaries result from rainfall and erosion in the Andes (McClain and Elsenbeer 2001; McClain and Naiman 2008). Much of the Amazon biodiversity results from processes occurring upstream in the Andean land system. There are lakes scattered across the middle to high elevations of the hotspot, most of which were formed from depressions created by mountain glaciers and are filled by runoff and groundwater. The altiplano of southern Peru and western Bolivia contains Lake Titicaca, the world's largest high-elevation lake. This lake is famous for its isolated and unique threatened freshwater biodiversity (Villwock 1994; Aguirre *et al.* 2001, Pouilly *et al.* 2014). Two large salt flats, Uyuni and Coipasa, and two lakes, Poopó and Uru Uru, occur in the southern altiplano. The lakes were recognized as Ramsar sites in July 2002. Lake Poopó used to be Bolivia's second-largest after Lake Titicaca, but water levels have declined over the past two decades, and it even dried up in 2015. The situation continues to be perilous, although water levels increase in the rainy season, the situation becomes critical in the dry season (De Munter *et al.* 2019).

4.2 Geology

The enormous biodiversity of the Tropical Andes should be understood in the context of the region's recent geological upheaval, much of which took place during the last 10 million years. As these peaks and ridges folded as a result of the collision between the Nazca tectonic plate (immersed in the marine environment) and the South American continental plate, many previously non-existent habitats appeared. This gave rise to multiple evolutionary and speciation linkages. In parallel, as this process advanced, a succession of organisms previously present in the southern and cold part of the continent migrated northward along the Andes and formed species complexes in the newly established altiplano habitats. Other types of organisms from the region's lowlands migrated to the new habitats formed at intermediate and higher altitudes, thereby diversifying them (Fjeldså *et al.* 2012; Raven 2012; Antonelli *et al.* 2018a).

The upheaval of the northern and central Andes is the result of compression and plate tectonic processes caused by the subduction of the oceanic crust under the South American plate. The complex arrangement of the northern Andes results from the additional action of the Caribbean Plate (Gregory-Wodzicki 2000, cited in CEPF 2015). Sections of the Andes began to rise at different times during the Mesozoic Era (250-66 million years ago), but the high elevations of the Andes rose relatively quickly during the past 20 million years (Gregory-Wodzicki 2000 and Garzione *et al.* 2008, cited in CEPF 2015; Antonelli *et al.* 2018a).

The Tropical Andes has many active volcanoes, clustered in two volcanic zones separated by areas of inactivity. The Northern Volcanic Zone includes numerous volcanoes from Nevado del Ruiz in Colombia, to Sangay in the south in Ecuador. The Central Volcanic Zone stretches from southern Peru to northern Chile and Argentina. Volcanoes in both zones show periods of recent activity, and some threaten human settlements (Stern 2004; Bustos *et al.* 2015).

The Andes hosts extensive mineral and salt deposits along with exploitable amounts of hydrocarbon. The southern portion of the hotspot in Chile and Peru contains some of the world's largest known porphyry copper deposits (Sthioul 2015). The dry climate of the central and western Andes also led to the creation of extensive potassium nitrate deposits. Another result of the dry climate is the salt flats of the southern altiplano, with lithium deposits that include the world's largest reserve of this element (Ströbele-Gregor 2013). Volcanic activity during the Mesozoic Era (250-66 million years ago) and Neogene Period (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 (Schneider 2011; CEPF 2015).

4.3 Climate

The influence and interaction of the tropical Pacific, the trade winds and the Amazon forest region with the hotspot territory contribute to a large seasonal and interannual variability in climate conditions, especially in temperature, relative humidity, wind and precipitation. As a result, humans, animals and plants have had to adapt to the heterogeneity of the landscape and the fluctuations in the hotspot's climatic conditions.

As is true for anywhere in the tropics, daily variation in temperature is greater than the seasonal temperature variation. The trade winds drop most of their moisture on the Andes' eastern slopes, creating a rain shadow and consequently drier conditions in the inter-Andean valleys and altiplano. North of the equator, the Pacific's warm waters produce humid conditions on the western Andean slopes. South of the equator, the Andes' western slopes are very dry due to the cold Humboldt Current running along the coast.

The temperature variability in the Tropical Andes depends mainly on the altitudinal gradient and the relative humidity. In general, the regions with more humidity tend to have less daily and annual thermal fluctuation (Cuesta *et al.* 2012b; Anderson *et al.* 2012). Average annual temperatures in the Tropical Andes reach values close to 27 °C in the inter-Andean low humidity valleys of Colombia or on the eastern borders of the Peruvian Andes (Cuesta *et al.* 2012a). As the Andes gain altitude, the average annual temperature decreases at a rate of approximately 6 °C for every 1,000 meters of altitude until it reaches the tropical alpine environments of the páramos and the punas, which are located at temperatures ranging from 3 °C to 9 °C (Cuesta *et al.* 2012b). While the average temperature decreases with altitude, the daily temperature range can increase with it. One factor that changes non-linearly with altitude is frost, which becomes a relevant climate factor only above mid to high altitudes. Other climate factors are affected by both local characteristics and geographic location; for example, the number of hours of exposure to solar radiation is determined by both slope orientation and altitude (Young 2012; CEPF 2015).

Unlike temperature, precipitation in the Andes does not follow a linear pattern but is determined by Andean orography and the influence of locally prevailing winds, which determine its high temporal and spatial variability. The climatological records for the 1960 to 2000 period report high variability with values below 200 mm per year in dry areas, up to 4000 mm or more in the eastern and western mountain ranges, and extreme values in very specific areas (Cuesta *et al.* 2012b).

Precipitation in the altiplano is associated with a summer dominated by moisture flows from the Amazon basin. More than 80 percent of annual precipitation occurs during the summer months, commonly during the afternoon and night, due to the effects of high solar radiation from the altiplano (Young 2012).

4.4 Habitats and Ecosystems

The Tropical Andes is a complex mosaic of more than 130 ecosystems with exceptionally high biodiversity (Myers *et al.* 2000; Josse *et al.* 2009 and 2012). The immense biological richness of the Andean mountain range is characterized by seven ecosystems types, which are the basis for a wide variety of wild resources, crops, and ecosystem services that support millions of people living in the region and its areas of influence (Cincotta *et al.* 2000; Cuesta *et al.* 2012a).

Páramos. Páramos are natural formations, limited to the upper parts of Andean volcanoes and mountains and dominated by tussock-forming grasses and shrublands. They occur above the continuous forest line and below the permanent snow line of the northern Andes' highest peaks in Venezuela, Colombia, Ecuador, and northern Peru (Hofstede *et al.* 2003 and 2014). Páramos often occur in very humid conditions under which vegetation and soils have developed a variety of 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 and have high levels of endemism in both species and genera (Hofstede *et al.* 2014; CEPF 2015). The southernmost páramos, known locally as "jalca" grasslands, occur in the high elevations of northern Peru west of the Marañón River (Tovar *et al.* 2012; Weigend 2002 and 2004).

Forests. Mountain and premontane forests,[2] rainforests, semi-deciduous and deciduous forests occupy a wide altitudinal range between 500 m and 3,500 m above sea level (Tosi 1960; Young and Valencia 1992; Cuesta *et al.* 2009; Tejedor *et al.* 2012). They are found along the steep sections of the western and eastern slopes of the Tropical Andes (from Venezuela to at least Bolivia) (Tovar *et al.* 2010). This type of forest 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 forests: the sub-Andean belt below 2000 m and the cordilleran belt, which runs from 2,000 m above sea level up to the tree line.

Humid punas. Humid punas occur from northern Peru to the central part of the eastern cordillera in Bolivia, including the endorreic basin of Lake Titicaca. The humid puna is a grassland ecosystem that covers a wide altitudinal range, from 2,000 m to 6,000 m above sea level, and is as extensive as the aforementioned mountain forests. Between them, they occupy about 40 percent of the Tropical Andes. They contain relics of Andean forests dominated by trees in the genus *Polylepis*. Significant portions of the humid puna were likely originally covered by *Polylepis* forests, but ancestral land uses by human settlers have significantly reduced these forests and replaced them with grasslands and scrub (Fjeldså and Krabbe, 1990; Fjeldså *et al.* 2012; Josse *et al.* 2009; Cuesta *et al.* 2012). Numerous large wetlands and peatlands are found in the topographic depressions of the humid puna.

Xerophytic punas. Another Andean grassland ecosystem, the xerophytic puna, is characterized by reduced precipitation and occurs in the central-southern part of western Bolivia, northwestern Argentina, southwestern Peru, and northeastern Chile. Xerophytic punas represent about 15 percent of the hotspot area, with an altitudinal range from 2,000 m above sea level in the eastern valleys to 5,000 m above sea level on the high peaks of the cordillera (Josse *et al.* 2009; CEPF 2015). The climate is very seasonal, with a very intense and cold dry season that is particularly accentuated to the south and west, with predominating semi-arid areas (Josse *et al.* 2009; Cuesta *et al.* 2012).

Inter-Andean valleys. Inter-Andean valleys contain a mosaic of ecosystems of seasonal dry mountain forests and xerophytic scrub in their intermediate and less elevated sections. They follow the courses of major rivers such as the Guayllabamba, Marañon and Apurimac and smaller deep valleys and ravines throughout the region. These areas have a pronounced water deficit due to the rain-shadow effect (Cuesta *et al.* 2012; CEPF 2015).

Salt flats. Salt flats occupy high Andean plains and fluvial-lake terraces on seasonally waterlogged or shallowly waterlogged saline clay soils with significant concentrations of lithium, potassium, boron, magnesium, carbonates and sulphates. They originated from old high-altitude lakes that dried up gradually as water evaporated and left behind salt concentrations several meters deep (Navarro and Maldonado 2003).

Glaciers and areas of cryoturbed soils. Glaciers are masses of ice that accumulate on the highest floors of the cordilleras (in the tropics above 5,000 m above sea level). They are

[2] Young and Valencia (1992) define as mountain forest the wooded vegetation located above 1,000 m of altitude in Peru, including the formations found on both slopes, as well as in the high altitudes of the Andes, often dominated by *Polylepis* species. The lower limit, although somewhat arbitrary, is generally applied to montane forests in Peru (Young and Valencia 1992). Huber and Riina (1997) also consider mountain forests to be forested formations with high moisture gradients, rainfall, and topographic variety, with some even below 500 m above sea level in the Andes of Argentina and Chile.

characterized by a balance between the accumulation and melting of ice. Their volume, stability and components change with time as a result of direct dependence on atmospheric conditions. The ice mass, therefore, has a dynamic character (Marangunic 2016). In South America, tropical glaciers are located between Bolivia and Venezuela, covering an area of approximately 2,758 km², distributed as follows: Peru 71 percent, Bolivia 20 percent, Ecuador 4 percent, Colombia 4 percent, and Venezuela 1 percent (Francou 2013).

The areas of flora and vegetation on cryoturbed soils correspond to regions where temperatures remain below 0 °C for most of the year. They occur in the high Andean areas covered by glaciers, ice or snow most of the year, although some places may be bare. This ecosystem exhibits a variety of microhabitats on the calcareous rocky substrate of the cliffs and steep slopes, with cracks, fissures and irregularities where spring water filters or meltwater flows (Montoya *et al.* 2019). Due to glacial dynamics, soils are subjected to a sequence of freezing and thawing. This phenomenon occurs daily in the upper Tropical Andes and causes the displacement of particles, modifying their distribution in the layers or strata. As a result, these soils present a different diversity, structure, physiology and ecology from those found in surrounding habitats (Cano *et al.* 2010 and 2011; Galán *et al.* 2014).

Other types of ecosystems. In addition to these main ecosystems, a number of transition zones to ecosystems outside 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 rainforest in the Chocó region. Similarly, most of the eastern border of the hotspot transitions to the lowland rainforest of the Amazon basin and the Orinoco region. Parts of the northern edge of the hotspot in Colombia and Venezuela transition to the Caribbean dry forest. The southern part of the hotspot in Chile and Argentina transitions to the dry Atacama Desert in southern Peru and northern Chile. Further south, the Atacama Desert gives way to temperate forests and the Chilean Mediterranean Forest and Valdivian Forests Hotspot (CEPF 2015).

Importantly, the Huancabamba Depression in northern Peru creates a natural dispersal barrier between the northern and central Andes and is therefore considered an immensely important transitional floristic area (Weigend 2002 and 2004; Mutke *et al.* 2014). The same is true for the fauna; the composition of the communities differs strikingly across this short distance, especially for small vertebrates (Fjeldså and Krabbe 1990; Koch *et al.* 2015 and 2016).

The freshwater systems also present a great variety of environments. They include high Andean systems at 3,000 m above sea level or higher, with lakes and lagoons of glacial origin, meadows, wetlands and headwaters of the main rivers that drain variously into the Amazon basin, the Caribbean in Colombia, and the Pacific Ocean in Colombia and northwest Ecuador (Maldonado *et al.* 2012; Tognelli *et al.* 2016). Between 700 m and 3,000 m above sea level, there are fewer lakes and lagoons; fast-flowing rivers, streams, and creeks predominate. In the Andean foothills below 700 m above sea level, larger, slower flowing rivers become more subdued as they descend (Maldonado *et al.* 2012; Tognelli *et al.* 2016).

4.5 Species Diversity, Endemism and Global Threat Status

The Tropical Andes is the most species-rich hotspot on the planet, both in absolute numbers of species and in the total number of endemic species (Mittermeier *et al.* 2011; CEPF 2015). Except for reptiles, all other groups of terrestrial and aquatic vertebrates and plants are greater in number there than any other hotspot. A widely recognized hypothesis is that South America's particular wealth of flora and fauna is based on three main phenomena. The first is the region's prolonged isolation from other continents during a significant portion of the

Cenozoic Era, from between 65 million years ago to 13-15 million years ago (Bacon *et al.* 2015; Carrillo *et al.* 2015). The other two phenomena are the exchange of animals and plants between North and South America that took place over the past 3 million to 10 million years (Cione *et al.* 2015, among others), and the formation of the Andes Mountains (CEPF 2015).

During glacial periods (the last major one of which occurred 20,000 years ago), the permanent snowline limit on the eastern slopes of the central Andes would have fallen between 1000 m and 2000 m. There would also have been a temperature drop of at least 6 °C to 8 °C in parts of the Andes located at 3,000 m above sea level. This situation would have stimulated the limits of the high Andean grasslands and humid mountain forests to move towards lower altitudes. The same would have happened in the northern Andes, generating similar changes in the páramos and forests (Reynel *et al.* 2013). On the more arid western slopes of the central Andes, the decrease in the permanent snowline limit would have been somewhat less, equivalent to about 500 m or 1000 m (Reynel *et al.* 2013).

One hypothesis linked to the glaciations is that of the existence of refugia for flora and fauna from humid environments during the Pleistocene Epoch when atmospheric humidity fell. As a result of the drop in global temperatures, habitats were reduced and fragmented giving way to semi-arid or savannah vegetation. The current biotas of the Andes, Amazon and Orinoco regions owe their richness in animal and plant species, in part, to specialization and sub-specific differentiation during the events that led to the fragmentation and subsequent expansion of the rainforests (Salo 1993; Haffer and Prance 2001; Reynel *et al.* 2013).

Another factor that favors high biodiversity in the Tropical Andes is proximity to other ecosystem hotspots and mosaics of ecosystems. These ecosystems include the lowland rainforests of the Chocó, Amazon and Orinoco regions, the dry forests of the Caribbean, the Mediterranean and southern Valdivian temperate forests, and the arid areas of the Atacama Desert. The extensive transition areas between the Andes and these ecosystems result in a confluence and mix of animals and plants in the adjacent zones (CEPF 2015).

The current diversity of Andean climates has also played a key role in explaining the high biodiversity of the Andes. Species diversity increases with annual precipitation, which helps explain the high biodiversity in the predominantly wet eastern slopes of the Andes and the very wet Chocó region of western Colombia and Ecuador (Pyron *et al.* 2013; Antonelli *et al.* 2018b; CEPF 2015). Spatial variation in climates also promotes species turnover across geography due to climatic niche specialization of plants and animals. Varied cactus flora can, for example, be found in the dry valleys just a few kilometers from the cloud forests of the Yungas where tree ferns, trees of the Brunellia genus and ericaceous scrubs thrive (Beck *et al.* 2007). Stable conditions in climate refugia can also be important in maintaining endemic species diversity (Fjeldså *et al.* 1999 and Graham *et al.* 2006, cited in CEPF 2015; Antonelli *et al.* 2018b).

Of South America's five hotspots, the Tropical Andes Hotspot is the most diverse, with more endemic species than anywhere else on the planet. The Tropical Andes Hotspot contains more than 35,000 vertebrate and vascular plant species (Mittermeier *et al.* 2011; CEPF 2015; Table 4.1). Fifty percent or more of the following species are endemic: fish (74 percent), amphibians (71.4 percent) and vascular plants (50 percent). Although the endemicity of reptiles (40 percent), birds (30 percent) and mammals (13.3 percent) is lower, it is still noteworthy.

When the hotspot's previous ecosystem profile was published in 2015, 814 species were considered globally threatened. The number of globally threatened species has increased substantially to 1,451. This change is explained by the recent assessment of several taxonomic groups (e.g., fish, reptiles, and plants) and the updating of others (amphibians) for the IUCN Red List of Threatened Species.

Table 4.1. Species Diversity, Endemism and Global Threat Status in the Tropical Andes Hotspot

Taxonomic group	Species	Endemic Species	Percentage of Endemism	Threatened Species
Vascular plants	~30,000	~15,000	~50.0	330
Fish	~900	666	~74.0	79
Amphibians	~1,120	800	~71.4	558
Reptiles	~700	275	~40.0	125
Birds	~2,000	600	~30.0	214
Mammals	~600	80	~13.3	88
Invertebrates	No data	No data	--	56
Fungi	No data	No data	--	1
Total	**~35,320**	**~17,421**	**~49.3**	**1,451**

Sources for the update: https://amphibiaweb.org/amphibian/newspecies.html; http://www.reptile-database.org/; https://www.mammaldiversity.org/; http://researcharchive.calacademy.org/research/ichthyology/catalog/ishcatmain.asp; https://www.fishbase.se/search.php; Tognelli *et al.* 2016; Herzog y Kattan 2012, CEPF 2015; www.iucnredlist.org.

The data in Table 4.1 are indicative because dozens of species of amphibians and other zoological and botanical groups have been discovered in the hotspot since 2015. Some groups have increased considerably since 2004 when the hotspot's species diversity data were first published (Mittermier *et al.* 2004). These data were used virtually unchanged by CEPF in 2015. Fish stand out for their increase, going from 317 to 900 described species (DoNascimiento *et al.* 2017 and 2018; Barriga 2012; Jiménez *et al.* 2015; De La Barra *et al.* 2016, Cala-Cala 2019). Also significant are amphibians, which increased from 961 to 1120 recorded species (https://amphibiaweb.org/amphibian/newspecies.html) and birds, which previously numbered 1,724 recorded species and are currently estimated at 2,000 (Herzog and Kattan 2012). This updated ecosystem profile incorporates, for the first time, threatened arthropods, mollusks and crustacean species.

The change in information about some amphibians is particularly noteworthy. For example, there are several recently described frog species of the *Pristimantis* and *Phrynopus* genus, about 27 and 10 species, respectively. These include *Pristimantis matildae* and *P. samaniegoi*, for which descriptions were published when this profile was updated. Other significant advances in the period 2015 to 2020 include the description of five species of the *Scytalopus* genus among birds, two species of *Cryptotis* among shrews, one species of snake of the *Bothrops* genus, and one species of salamander of the *Bolitoglossa* genus.

4.5.1 Plants

Overall, the Tropical Andes is home to more than 30,000 species of vascular plants (about 10 percent of the world's species), surpassing the diversity of any other hotspot (Myers *et al.* 2000; Mittermeier *et al.* 2011). It is a world leader in plant endemism as an estimated 50 to 60 percent of these species are found nowhere else in the world. This means that about 7 percent of the world's vascular plants are endemic to approximately 1 percent of the Earth's landmass (Myers *et al.* 2000).

The Lauraceae is the most species-rich family among woody plants with a diameter at breast height (DBH) of 2.5 cm and greater occurring between 1,500 m and 2,900 m above sea level in Andean mountain forests. It is followed by the Rubiaceae and Melastomataceae families. At higher elevations, the Asteraceae and Ericaceae families become the most species-rich elements of woody flora (Gentry 1995; Jorgensen *et al.* 2012).

Research over the past decades has revealed several patterns of diversity and endemism in Andean plants. Tropical Andean forests are floristically different from their lowland counterparts. They contain a significant representation of the Laurasian plant families and genera that are absent or rare in the lowlands. (Laurasia is the former supercontinent made up of present-day North America and Eurasia that existed approximately 300 to 100 million years ago. It is presumed that these groups dispersed to the Andes after the closure of the Isthmus of Panama. Examples are the Fagaceae (oaks) in Colombia, the Ericaceae (heath family) and the Lauraceae (avocado family). In general, diversity decreases with altitude in the hotspot (*i.e*., elevations higher than 1,000 m above sea level), whereas endemism often increases with altitude (CEPF 2015).

Investigation into the global threat status of Andean plants is just beginning. So far, only a few groups of Andean plants have been fully assessed by the IUCN and published in its Red List of Threatened Species. This was done with CEPF funding. The resulting assessments highlighted botanical families such as Cactaceae, Bromeliaceae, Poaceae Solanaceae and Meliaceae, among others. Some genera with several threatened species include, for example, Puya spp. and Tillandsia spp. (Bromeliaceae), *Espeletia* spp. and *Espeletiopsis* spp. (Asteraceae), *Echinopsis* spp. (Cactaceae) and *Magnolia* spp. (Magnoliaceae). The plant species at risk are those with small distributions that are threatened by habitat destruction. Exceptionally for plants (as opposed to vertebrates, whose threatened species are concentrated at lower altitudes), the high-altitude species restricted to the isolated páramos of the northern tropical Andes are particularly threatened (such as frailejones in the Espeletia genus). Small distributions of these species and constant threats of habitat transformation have led to this result (Joppa *et al.* 2011; CEPF 2015; Peyre *et al.* 2019).

4.5.2 Fish

An estimated 900 species of freshwater fish have been documented in the hotspot, a relatively small number compared to the striking diversity of the Amazon lowland drainage and some other hotspots (Ortega and Hidalgo 2008; Mittermeier *et al.* 2011; Tognelli *et al.* 2016). The work of adding fish to the IUCN Red List of Threatened Species and the inventories and taxonomic reviews by various specialists throughout the Tropical Andes have catapulted the known number of species over the last 10 to 15 years (see, for example, DoNascimiento *et al.* 2017 and 2018, Jimenez *et al.* 2015, De La Barra *et al.* 2016, Cala-Cala 2019). Fish habitats include high-altitude lakes (Peru alone has 12,000 high-altitude lakes) and small to medium-sized rivers, with diversity decreasing sharply with altitude (Scott and Carbonell 1986). In Ecuador, for example, only one species of fish (*Grundulus quitoensis*, a relative of the tetras) is found 2,800 m above sea level (Barriga 2012). 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 altitude, warmer waters (Ortega *et al.* 2011). One group of cold-water fish belonging to the challhuas genus (Orestias), comprises more than 40 species, shared by Peru, Bolivia and Chile and is endemic to the high Andean zone (3,000 m above sea level and higher) and of these, about 20 species are found in Lake Titicaca and nearby drainages (Sarmiento *et al.* 2018). All but a few of the 90 species of naked sucker-mouth catfish in the Astroblepidae family are also endemic to the Tropical Andes. These unique animals can use their sucker-like mouths and modified pelvic fins to climb the waterfalls of

fast-flowing mountain streams. The pencil catfish (*Trichomycterus genus*) are an Andean group that is typically restricted to a single drainage system and may be the only fish species capable of living in their high-altitude habitats (Ortega *et al.* 2011).
In recent years, there have been determined efforts to assess the conservation status of Andean inland fish (Tognelli *et al.* 2016). Twenty challhua species are threatened in Bolivia due to overfishing, introduced species and habitat modification. Three pencil catfish are also threatened in that country due to water pollution (Sarmiento *et al.* 2018). In Colombia, a small catfish (*Rhizosomichthys totae*) endemic to Lake Tota in the Cordillera Oriental, became extinct last century, presumably due to the introduction of rainbow trout (*Onchorhynchus mykiss*) (Mojica *et al.* 2002).

4.5.3 Amphibians

The Tropical Andes is the most diverse hotspot in the world for amphibians, with 1,120 species, of which approximately 800 are endemic. These numbers are double those of the next most diverse hotspots for this group, Mesoamerica and the Atlantic Forest of Brazil. Amphibians are more diverse in the montane rainforests than in the Amazon forests and the reason for this imbalance appears to be regional diversity patterns, as lowland amphibians are generally more widely distributed than those in the Altiplano (Ron 2000). Although Andean amphibian communities have lower local diversity, species turnover in the region is higher. In the Andes, amphibian fauna is largely restricted to frogs and toads. Salamanders are rare, with only about 11 species, some of which have extremely narrow ranges of distribution, such as the recently described *Bolitoglossa awajun*. Caecilians are even rarer with at least two species, one of which, *Epicrionops bicolor*, occurs at 2,000 m above sea level in Colombia. Among toads and frogs, the most diverse genera are *Pristimantis, Telmatobius* and *Atelopus*.

Some very well-known amphibians of the Tropical Andes are the marsupial frogs of the *Gastrotheca* genus, in which the females of some species carry their eggs in pouches on their backs (Duellman *et al.* 2014; Canatella 2015; Duellman and Venegas 2016). The harlequin toads, *Atelopus* genus, are a diverse and brightly colored group that inhabits streams and wetlands primarily in the Andes of Ecuador, Colombia and Venezuela (Coloma *et al.* 2010; Marcillo-Lara *et al.* 2020). Some members of the poisonous frog family (Dendrobatidae) are also found in the Andes. One of them, *Epipedobates anthonyi*, presumably produces a compound more powerful than morphine, which was once considered a source of new medicines, but later dismissed (Cipriani and Rivera 2009; Kahn *et al.* 2016). The giant Titicaca frog (*Telmatobius culeus*) is an aquatic frog with deeply wrinkled skin intensively collected for commercial purposes because of its value as a source of protein for local communities and use in traditional medicine in the Lake Titicaca region (Ramos *et al.* 2019). However, such uses constitute a health risk since infection with chytrid fungus and other pathogens and parasites has been detected in several specimens analyzed (Chero *et al.* 2014; Berenguel *et al.* 2016; Zevallos *et al.* 2016). Another giant frog, *Telmatobius macrostomus*, known as Junín frog, is considered under threat due to mining and solid waste contamination, predation by introduced trout, and commercial over-exploitation for consumption (Lazo and Mendoza 2017).

Amphibians represent just over 52 percent of all threatened vertebrate species in the Tropical Andes Hotspot (Table 4.1). They tend to have smaller distribution ranges than other vertebrates, making them more likely to fall within the IUCN Red List of Threatened Species extent of occurrence (EOO) thresholds for threatened categories (www.iucnredlist.org). Although amphibians in the Tropical Andes are threatened by habitat destruction, as are other species, they are also threatened by poorly understood phenomena, including diseases such as chytridiomycosis, caused by the *Batrachochytrium dendrobatidis* fungus, and climate change

(Stuart *et al.* 2004; Catenazzi *et al.* 2011; Catenazzi and von May 2014; Berenguel *et al.* 2016).

4.5.4 Reptiles

Seven hundred species of reptiles have been identified in the Tropical Andes Hotspot, of which at least 275 are endemic. Only the Mesoamerican Hotspot has more reptile species. Global reptile diversity 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-altitude ecosystems harbor low diversity reptile communities, although species that do occur there are more likely to be endemic to small areas (Urbina-Cardona 2011).

Charismatic reptiles such as caimans, turtles, and boas are largely restricted to the lowlands, so the Andes are characterized by mostly small-bodied lizards and snakes. The diverse lizard genus Anolis contains numerous species in the Andean cloud forests. This genus reaches the southern extent of its range in Bolivia (Grisales-Martinez *et al.* 2017). *Liolaemus* lizards are characteristic of the Altiplano grasslands, dry scrub and rocky hillsides of the southern Tropical Andes (Aguilar *et al.* 2013). One species, *Liolaemus montanus*, inhabits the Andes at unusually high elevations for a reptile. A population has been reported at 5,176 m above sea level in the Cordillera Real in Bolivia (Aparicio and Ocampo, 2010). Most Andean snakes are harmless, although a few are poisonous, such as the Andean lancehead viper (*Bothrocophias andianus*), which is endemic to the high-altitude evergreen forests of Bolivia and Peru. An additional snake has recently been described for the central Andes in Bolivia and Peru, *Bothrops monsignifer* (Timms *et al.* 2019).

As previously mentioned, the IUCN recently assessed several groups of reptiles. This is an important development since information about this group had lagged behind that available for other vertebrates. Thus far, dozens of Tropical Andes reptile species have been classified in the categories of vulnerable, endangered and critically endangered. Genera with several threatened species include *Anolis* spp. (Iguanidae), *Liolaemus* spp. (Liolaemidae) and *Stenocercus* spp. (Tropiduridae), among others.

4.5.5 Birds

With nearly 2,000 species, a third of them endemic, birds are the most diverse vertebrates in the hotspot and constitute another group with greater diversity in the Tropical Andes than in any other hotspot (Herzog and Kattan 2012). The 2015 ecosystem profile considered 1,724 species, but the estimate of Herzog and Kattan (2012) is appreciably higher and may now exceed 2,000 species. In addition to recent discoveries, taxonomic revisions of some groups have resulted in the reclassification or validation of several species that were previously considered subspecies (see, for example, Chesser *et al.* 2020 or Isler *et al.* 2020). Despite centuries of study, new species are continually being found while exploring little-studied areas, and new genetic analysis techniques and other technologies improve our knowledge of species (e.g., Cuervo *et al.* 2005). Between 2015 and 2020, for example, five Scytalopus species were discovered (Avendaño *et al.* 2015; Stiles *et al.* 2017; Krabbe *et al.* 2020). As a result of the recent taxonomic revision of the rufous antpitta (*Grallaria rufula*) complex, three species increased to 16. Six new species of this bird, which has populations that occur in the humid montane forests of the Andes from northern Colombia and adjacent Venezuela to central Bolivia, were described, and seven subspecies were promoted to novel species (Chesser *et al.* 2020; Isler *et al.* 2020).

No bird family is endemic to the Andes, but groups such as hummingbirds (Trochilidae), flycatchers (Tyrannidae), and tanagers (Thraupidae) are particularly diverse. Biodiversity derives both from rapid speciation within the Andes and from constant colonization by older lowland lineages (Fjeldså and Rahbek 2006). Several closely related species groups (e.g., the *Catharus*, *Basileuterus*, and *Tangara* genera) show patterns of species turnover along altitudinal gradients.

Among the characteristic birds of the Andes is the cock-of-the-rock (*Rupicola peruvianus*), with its brilliant coloration and striking nuptial displays in areas near mountain streams. Similarly, the endangered Andean condor (*Vultur gryphus*), which flies over the high Andes and is always an exciting spectacle, has been the subject of intensive reintroduction campaigns in the northern Tropical Andes (Wallace *et al.* 2020). Condors are part of indigenous Andean cosmologies and symbolically used by indigenous people to represent their conflict with the Spanish conquistadors, represented by bulls (Piana 2019).

As a sign of the adaptation of birds to a wide variety of environmental conditions, evidence has been found of birds, such as the white-winged diuca finch (*Diuca speculifera*), nesting directly on ice on the snowy Quelccaya in the Cordillera Vilcanota (Peru), at elevations of up to 5,300 m above sea level (Hardy and Hardy 2008).

About 11 percent of the bird life in the Tropical Andes is threatened with extinction, approximately the same percentage as for birds globally. Several endangered species in this region, such as cracids, hawks and falcons, are found both in the Andes and adjacent lowland habitats outside the hotspot. Most of the bird's endemic to the hotspot are not globally threatened. Many endemic species are distributed along narrow altitudinal ranges, especially on the eastern slopes of the Andes. Several species are found within these small altitudinal ranges all the way from Venezuela to Bolivia. The large distribution and size of the populations of these species buffer them from threats that operate at more local levels, resulting in a lower proportion of globally threatened species than might be expected from the large number of endemic species.

Among the main threats to birds are the disturbance of habitats by mining, the degradation of natural vegetation, and the conversion of natural forests into agricultural and grazing areas. Some valleys are also severely degraded, especially north of the hotspot. Subsistence hunting of some large species, such as cracids (guans) and tinamids (tinamous), also poses a threat, though to a lesser extent.

4.5.6 Mammals

The 600 species of mammals in the Tropical Andes Hotspot represent just under 9 percent of this group's global diversity (Burgin *et al.* 2018). No other hotspot has a greater diversity of mammals. As elsewhere in the tropics, most of the species are rodents and bats (Mena *et al.* 2012). Rodents are found in all Andean habitats and are especially diverse in the montane evergreen forests, where several genera exhibit high levels of endemism (Mena *et al.* 2012; Noguera-Urbano and Escalante 2015). Andean bats are more diverse in lower elevations, with diversity decreasing dramatically above the tree line (Patterson *et al.* 2012). The large mammals of the Andes are remnants of a much more diverse megafauna community that became diminished with the arrival of humans on the continent (Eisenberg and Redford 1998; Burney and Flannery 2005). Among them, guanaco (*Lama guanicoe*) and vicuña (*Vicugna vicugna*) are iconic camelids that continue to thrive in the southern Tropical Andes. Other large mammals, such as mountain tapir (*Tapirus pinchaque*), taruca or Andean deer (*Hippocamelus antisensis*), jaguar (*Panthera onca*), puma (*Puma concolor*) and spectacled bear (*Tremarctos *ornatus*), as well as the Altiplano deers (*Mazama rufina*, *M. chunyi* and *Pudu mephistopheles*), are rarely seen due to their scarcity, the dense habitats they inhabit and their evasive behavior.

An interesting case of a species of tree carnivore from the Tropical Andes is the olinguito (*Bassaricyon neblina*). It was described in 2013 based on analysis of a museum specimen collected 90 years earlier in 1923 by G.H.H. Tate for the Field Museum of Chicago (Helgen *et al.* 2013). Originally misidentified by researchers, the olinguito is the first carnivore species to be described in the Western Hemisphere in 35 years. This carnivore of the raccoon and coati family is now known to live in the cloud forests of several natural protected areas in the northern Andes, stretching from central Colombia to western Ecuador (Helgen *et al.* 2013).

Although the olinguito is considered a Near Threatened species on the IUCN Red List, not all mammal species in the hotspot can boast this status. Several dozen are threatened, including numerous species of carnivores, primates, rodents, and ungulates. The proportion of threatened mammals in the hotspot (13.1 percent) is lower than the global average (20 percent) (Schipper *et al.* 2008; Burgin *et al.* 2018). Mammals in the Tropical Andes, as elsewhere, are threatened by habitat destruction. Commercial and subsistence hunting or hunting for traditional medicine are major threats to mammals in other parts of the world but low in the Tropical Andes (Aquino *et al.* 2015 and 2017).

4.5.7 Arthropods

Arthropods play a valuable role in ecosystems not only as relevant components of the food web, constituting a large proportion of species and biomass richness, but also as predators, nutrient recyclers, and ecosystem engineers (García and Chacón de Ulloa 2005; Culliney *et al.*2013, Guzmán-Mendoza *et al.* 2016). They are also important biological indicators of ecosystem health or environmental change (McGeoch and Chow 1998). Despite their importance, IUCN estimates that only 0.9 percent of the described insect species, 4 percent of crustaceans, and 0.31 percent of arachnids have been assessed (Roskov *et al.* 2019). Only exceptionally have arthropods been the subject of special consideration, partly due to the lack of taxonomic, biogeographic, and natural history information and partly because these smaller species are assumed to be contained in natural protected areas (Dourojeanni 2019).

4.5.8 Fungi

Despite their biological importance as decomposers of organic matter, only an estimated 5 percent of the planet's fungi are described. Little is known about their taxonomy and natural history; there are few specialists, and not much interest or effort has been put into analyzing their state of conservation. Fungi are threatened by the loss of symbiotic habitats and hosts, pollution, overexploitation of edible species and climate change, but the vast majority of fungal species have not yet been evaluated. In July 2020, the IUCN Red List of Threatened Species was updated, listing 313 species of fungi globally, of which 166 are endangered. However, no comprehensive assessments of this group have been conducted in the Tropical Andes Hotspot. The only known threatened fungus is *Stilbohypoxylon macrosporum*, a rare species that appears to be limited to the southern zone of subtropical dry forests between Jujuy and Mendoza, Argentina (Kuhar *et al.* 2020).

4.6 Importance of Ecosystem Services

The ecosystems of the Tropical Andes Hotspot have supported human settlements for more than 13,000 years (Fuselli *et al.* 2003; Yacobaccio and Morales 2011). From about 500 B.C., large human settlements emerged in the central and northern Andes and achieved advanced forms of social and political organization (*i.e.*, Chavin, Moche, Tiwanaku, Cañari, and Inca). In time, they all collapsed or were incorporated into the most important civilization of the region, the short-lived Inca Empire that emerged around 1400 A.D. (Rostworowski 1993). These cultures contributed to the domestication of numerous species, making this region one of the 12 major centers of origin of plants grown for food, medicine and industry in the world (Saavedra and Freese 1986; Pickersgill 2007).

The area currently has a population of 59.7 million people most of whom are highly dependent on the region's ecosystem goods and services. Numerous cities are located in the hotspot and benefit from its ecosystem services. At least, ten cities have populations greater than 500,000: Caracas (Venezuela); Bogotá, Bucaramanga, Cali, Ibagué, and Medellín (Colombia); Quito (Ecuador); La Paz and Cochabamba (Bolivia); and San Miguel de Tucumán (Argentina). Four of these cities are national capitals. In addition, the inhabitants of cities located hundreds or even thousands of kilometers away from the Tropical Andes, like Lima (Peru), Guayaquil (Ecuador), Santa Marta (Colombia), and Santa Cruz de la Sierra (Bolivia), also benefit directly from services such as the provision of water supplied by the hotspot.

Ecosystem services, also known as 'nature's contributions to people', are defined as the benefits that people obtain from ecosystems and can be divided into four categories:

- *supply or provisioning services* (e.g., water, food, plant-based fuels),
- *regulating services* (e.g., climate regulation, flood control),
- *supporting services* (e.g., soil formation, nutrient recycling), and
- *cultural services* (e.g., recreational, religious, spiritual values, artistic inspiration) (Reid *et al*. 2005; De Groot 2010).

The Tropical Andes provides abundant ecosystem services in all these categories (Table 4.2).

Provisioning services. Among provisioning services, water is the most abundant and important, providing drinking water and energy. The hotspot can be considered South America's primary source of fresh water. Streams originating in the páramos, altiplano, high-altitude forests and lakes, and the Andean glaciers, supply water to the cities and towns of the hotspot. They also supply water to the extensive drainage systems located downstream of these basins in the north and west of South America.

Andean rivers provide most of the irrigation water for the farmland and hydroelectric plants that generate approximately half of the region's electricity (Bradley *et al.* 2006). This service is of great social and economic importance because of the water it provides for human activities and because it supports terrestrial and aquatic plant diversity and wild animals and their habitats (Cerrón *et al.* 2019). The Tropical Andes is the source of the main stem of the Amazon River, the world's largest river, which flows into the Atlantic Ocean. Dozens of other major rivers drain from the Tropical Andes into the Pacific and Caribbean slopes of the hotspot.

Other provisioning services provided by the hotspot are:

- the supply of animal protein through hunting (especially mammals and large birds) and subsistence fishing (the latter particularly in the great Altiplano lakes of Peru and Bolivia).
- the provision of fruits, seeds, honey and other plant products extracted from natural ecosystems.
- crop wild relatives that offer genetic diversity to obtain new varieties and support crop improvement (peppers *Capsicum spp.*, potatoes and tomatoes *Solanum spp*. and *Lycopersicum spp*., yuccas *Manihot spp*., blackberries *Rubus spp*., cacao *Theobroma spp.,* wild papayas *Carica spp.*, beans *Phaseolus spp*. and *Chenopodium spp*., guabas *Inga spp.,* prickly pears *Opuntia spp*., Passifloraceae, Cucurbitaceae, others) (Asturiaga *et al.* 2006).
- medicinal plants and animals (*Cinchona spp., Piper spp., Lepidium spp., Croton spp., Uncaria spp.*, among others).
- fibres (cotton *Gossypium spp.*, reeds *Scirpus spp.*).
- livestock grazing in the altiplano and páramos (with seasonal grasses dependent on the rainfall regime) and
- extensive extraction of firewood and wood exploitation for domestic, agricultural, construction (wood girders and beams, palm leaves for roofs, palm shafts for floors and platforms) and commercial purposes.

In other words, the forests and other wild ecosystems of the Andean mountains are the natural pantries of the local populations (Moraes *et al.* 2006).

Regulating services. Water flow control is a valuable regulating service provided by Andean wetlands. The region's wetlands regulate the flow from highly seasonal precipitation, providing water even in periods of low rainfall (Anderson *et al.* 2011).

The natural vegetation and soils of the Andes store significant amounts of carbon, ranging from less than 50 metric tons per hectare in grassland and peatland systems to 250 metric tons per hectare in lower montane forests (Saatchi *et al.* 2011; Rolando *et al.* 2017). Changes in land-use patterns in these areas would release much of that carbon. The hotspot has an important role to play in carbon storage to regulate the global carbon budget and to mitigate climate change, as noted in Chapter 10.

Natural ecosystems also help retain soil, thereby contributing to soil fertility for agriculture and preventing landslides on steep slopes during periods of high rainfall. Forests and vegetation mitigate erosion and moderate suspended sediment loads in rivers and streams, and support groundwater recharge (Anderson *et al.* 2011; CEPF 2015; Blancas *et al.* 2018). These ecosystems also help regulate climates by forming the fundamental components of the water cycle and limiting the degree to which solar radiation heats the air (Ruiz *et al.* 2007). In cloud forests, trees intercept fog, which condenses and is discharged into streams and rivers (Tovar *et al.* 2010).

The natural vegetation of the rugged terrain of the steep slopes of the Tropical Andes provides an important disaster mitigation service by efficiently retaining soils and reducing the risk of landslides and avalanches. This makes a strong case for using native woody species to restore degraded areas through reforestation and agroforestry initiatives. Herbaceous and woody vegetation help with the infiltration of water from rainfall into the soil, which stores it like a sponge and then releases it clean throughout the year (Huasasquiche and Kometter 2017).

The presence of forests and other natural vegetation improves infiltration and water quality and decreases surface runoff. Additionally, it protects organic and mineralized soil layers. It also helps regulate water flows and protect the soil from the action of rainfall and runoff, thereby reducing erosion of sloped soils, moderating the load of suspended sediments in streams and recharging subway aquifers. Plant cover thus maintains the fertile layer in the upper levels of the soil where it is accessible to plants. Leaf litter in the soil cushions water fall and therefore reduces soil erosion (Albán 2007).

In the rainy season, the forest vegetation intercepts raindrops and reduces their impact on soils, thereby helping to prevent erosion and landslides to the lower reaches. Similarly, overflows of watercourses are controlled by strips of riparian vegetation, protecting above all the upper catchment basins (Cerrón *et al.* 2019).

Forests, shrublands and wetlands have a significant potential for carbon sequestration, but deforestation, burning, grazing and drainage of water bodies cause the oxidation of the carbon stored in them and the release of CO2. These Andean ecosystems can contribute to the mitigation of greenhouse gas emissions, but more research is needed on the dynamics of carbon, from its capture in vegetation to becoming part of the soil (Yaranga and Custodio 2013; Suárez *et al.* 2016; Rolando *et al.* 2017). In the páramos, carbon stocks decrease as land-use changes from natural vegetation to agriculture; probably the removal of the vegetation cover that protects the soil reduces the entrance of organic matter into the soil and increases the rate of decomposition of plant residues, thus this change causes rapid loss of carbon from the biomass, accompanied by soil carbon depletion (Castañeda-Martín *et al.* 2017).

Climate resilience, or resilience to climate change, is the ability to cope with climatic disturbances and stress (Tyler *et al.* 2013). In this sense, the different ecosystems of the Tropical Andes contribute to the storage of greenhouse gases and act as a natural buffer against extreme weather events, such as tropical storms, droughts and frosts. They also provide drinking water, habitat, food, raw materials and a series of services that are essential for the life and food security of the human population (Andrade 2010; Uribe 2015).

Supporting services. Supporting services of the Tropical Andes include crop pollination and soil formation. Native pollinators (insects, birds such as hummingbirds and bats) are essential for the pollinating of Andean crops such as coffee, potatoes, tomatoes, lulo or naranjilla (*Solanum quitoense*; used in fruit drinks mainly in Colombia and Ecuador), chocho or tarwi (*Lupinus mutabilis*), capuli (*Prunus salicifolia*), and Passifloraceae such as passion fruit (Pantoja *et al.* 2004; Anteparra *et al.* 2013; Abrahamczyk *et al.* 2014).

Cultural services. Cultural services without monetary value are provided by extraordinary biodiversity and landscape, as they generate aesthetic appreciation and inspiration for artistic creation and culture and invite relaxation and stress reduction. The ancestral knowledge of indigenous populations has great potential for the identification of new products. At the same time, the scenic value has sustained a thriving tourism industry that generates income locally, nationally, and internationally. Prior to COVID, the Andes provided numerous opportunities to engage in adventure tourism or nature sports (Baiker 2011).

Ecotourism has been an important sustainable income source for local communities, as it generated fair employment and more equitable distribution of income. Some activities include canoeing, hiking, and high-altitude mountaineering, caving, rock climbing, and photography (of wild birds, insects, flowers, waterfalls, and others). It is also worth mentioning the opportunities for scientific research that the hotspot offers.

Table 4.2. Ecosystem Services Provided by the Tropical Andes Hotspot

Service	Beneficiaries	Relative importance
Provisioning		
Water (drinking, irrigation, navigation, industrial and domestic use, energy generation)	All residents of the hotspot and downstream drainages	Highly significant in the hotspot and throughout drainages of northern and central South America, including the Orinoco and Amazon River Basins
Food (animal protein from hunting and fishing, honey, wild plants)	Rural and indigenous communities and some urban areas	Locally important, especially for indigenous groups
Wild relatives of crops	All humankind	Globally significant
Animals and medicinal plants	Rural and indigenous communities and some urban areas, including all humankind	Locally important throughout the hotspot
Grazing	Rural communities and national and international consumers of meat and textile products	Significant in high-altitude grassland ecosystems throughout the hotspot
Firewood and other vegetable fuels	Indigenous and rural communities	Locally important especially in all non-urban areas of the hotspot
Timber	Rural communities	Locally important, especially in all non-urban areas of the hotspot
Regulating		
Sediment retention	All communities and cities within the hotspot	Significant throughout the hotspot
Down-slope safety	Most communities and cities within the hotspot	Significant throughout the hotspot
Carbon sequestration and storage	All humankind	Globally significant
Climate regulation	All residents of the hotspot	Significant throughout the hotspot
Disaster mitigation	All residents of the hotspot	Significant throughout the hotspot
Resilience to climate change	All residents of the hotspot	Significant throughout the hotspot
Biological control of pests and disease vectors	All residents of the hotspot	Significant throughout the hotspot
Supporting		
Photosynthesis, pollination, biological control, soil formation	All residents of the hotspot	Significant throughout the hotspot
Water disposal	All residents of the hotspot and downstream drainages	Significant in the hotspot and throughout drainages

Cultural		
Ecotourism opportunities	Local, national, and international tour operators and tourism infrastructure support staff, as well as local guides	Locally and regionally important throughout the hotspot
Scientific research and innovation	All humankind	Globally significant
Scenic beauty and spiritual value, inspiration	All humankind	Globally significant

Source: Adapted from CEPF 2015.

5 HOTSPOT CONSERVATION OUTCOMES

The Tropical Andes boasts exceptional species richness and endemism influenced by the heterogeneity of habitats and elevated slopes found along the length and breadth of this mountain range. This is a considerable challenge for conservation, making it necessary to implement strategies that maximize limited resources, effectively prevent species extinction, and safeguard the ecological processes required for biodiversity survival. CEPF, therefore, defines conservation outcomes for its investment based on a set of globally threatened species as well as KBAs and conservation corridors where actions should be focused to avoid extinction.

IUCN's assessment that categorizes species according to their degree of threat at the global level is an important tool for identifying those species most vulnerable to extinction. An advantage of the information provided by IUCN on the distribution of the vast majority of species that have been assessed is that it is easy to access and process. In addition, it is complemented by information shared by expert groups on taxonomy, population trends, threats and conservation actions for species, among others, making it a valuable resource for identifying conservation investment priorities.

Land-use change is currently the biggest driver of biodiversity loss. The conversion of forests, grasslands, savannahs and wetlands is destroying natural habitats for species and affecting both the provision of ecosystem services and human well-being (WWF 2020). This is why it is so important to protect areas that allow for the conservation of both species and the habitat they require to survive. Although protected areas have increased in recent decades to cover 15 percent of the land area globally and 34 percent of the Tropical Andes Hotspot, they do not provide sufficient coverage for 72 percent of vertebrates and 90 percent of threatened vertebrates in the Tropical Andes (UNEP-WCMC and IUCN 2020; Bax and Francesconi 2019). Thus, complementary conservation strategies, such as the identification of KBAs, have been developed to generate a global consensus on the importance of certain sites for biodiversity (IUCN 2016). This strategy also has great potential to engage civil society and communities in conserving species and ecosystems.

To ensure that KBAs provide the necessary area and resources for species, there must also be some functional connectivity that ensures the permanence of species and their genetic diversity (Baguette *et al.* 2013). Conservation corridors are strategic areas that allow for connectivity between wildlife populations and their habitat and protect the ecosystem services they provide. With this sequential approach of species, sites and corridors, CEPF ensures that it complements national conservation priorities to achieve a feasible strategy and better use of available resources for ecosystem management in the Tropical Andes Hotspot.

5.1 Species Outcomes

The list of threatened species for the Tropical Andes Hotspot was determined from distribution information provided by the IUCN. All species in the hotspot included in one of three global threat categories—Critically Endangered (CR), Endangered (EN) or Vulnerable (VU)—were considered. We used data available from the IUCN Red List of Threatened Species as of July 2020 (IUCN 2020), as well as the most recent assessment data for plants and reptiles as of August 2020 (M. Tognelli unpublished data).

Overall, a total of 1,451 threatened species were identified in the hotspot (Appendix 5.1), representing 13 taxonomic classes in groups of amphibians, arthropods (insects and crustaceans), birds, fungi, mammals, molluscs (bivalves and gastropods), fish, plants and reptiles (Table 5.1). The 2015 ecosystem profile included 814 threatened species of amphibians (503 species), birds (203 species), mammals (82 species), fish (7 species) and reptiles (19 species). It also considered 1,313 species with restricted distribution that have not been covered in this work. Between 2015 and 2020, IUCN conducted assessments of fish, reptiles and plants and other taxonomic groups, thereby providing a better representation of these taxonomic groups.

Table 5.1. Globally Threatened Species in the Tropical Andes Hotspot

Taxonomic group	Common name	Critically Endangered	Endangered	Vulnerable	Total
Animalia					
Vertebrates					
Actinopterygii	Fish	11	31	37	79
Amphibia	Amphibians	102	277	179	558
Birds	Birds	19	74	121	214
Mammalia	Mammals	8	25	55	88
Reptilia	Reptiles	19	48	58	125
Subtotal		**159**	**455**	**450**	**1,064**
Invertebrates					
Bivalvia	Molluscs	1		1	2
Gastropoda	Snails and slugs	1		6	7
Insecta	Insects	7	23	16	46
Malacostraca	Crabs, lobsters and relatives			1	1
Subtotal		**9**	**23**	**24**	**56**
Fungi					
Sordariomycetes	Fungus	1			1
Subtotal		**1**			**1**
Plantae					
Liliopsida	Monocotyledons	21	39	14	74
Lycopodiopsida	Aquatic lycophytes	2		4	6
Magnoliopsida	Dicotyledons	47	108	95	250
Subtotal		**70**	**147**	**113**	**330**
Total		**239**	**625**	**587**	**1,451**
Percentage		**16.5**	**43**	**40.5**	

Amphibians

Amphibians are the most threatened group in the Tropical Andes (Table 5.1). Among them, rain frogs (order Anura) are the family of frogs, with the highest number of threatened species (Craugastoridae, 241 species). Widely distributed from the southern United States to northern Argentina, they represent almost half (43 percent) of the threatened amphibians in the hotspot (Armesto and Señaris 2017). They include the genus *Pristimantis*, which, in addition to being the most threatened genus in the Tropical Andes (180 species), is also considered the most diverse genus of terrestrial vertebrates (Waddell *et al.* 2018).

The second most threatened family is the toad family (Bufonidae, 72 species), which has a wide global distribution and is found in diverse ecosystems between 0 and 4,800 m above sea level. The family Bufonidae includes *Atelopus* or harlequin frogs (43 species), a genus for which the most severe population declines have been reported (La Marca *et al.* 2005). For example, only one of the nine species of the genus described in Venezuela currently has a known population (Molina *et al.* 2009). Similarly, the Quito stubfoot toad (*A. ignescens*, CR), once a locally abundant species in upland habitats of Ecuador, was presumed extinct until it was rediscovered in 2016 (Coloma 2016). The reasons cited for these declines, which have even occurred in apparently pristine habitats, are a combination of the fungal disease chytridiomycosis and climate change (Pounds *et al.* 2006).

Among threatened anuran amphibians, rain frogs and toads are followed, in terms of degree of threat, by families endemic to Central and South America: the glass frogs (Centrolenidae, 49 species), the poison dart frogs (Dendrobatidae, 45 species) and the highly-threatened *Telmatobius*, the only genus of the aquatic frog family (Telmatobiidae, 46 species). The latter includes the Titicaca water frog (*T. culeus*, EN), which was once so abundant that it was collected with nets for food but is now possibly affected by water pollution (IUCN SSC Amphibian Specialist Group 2020).

Amphibians represent more than a third of all threatened species in the Tropical Andes Hotspot. In general, they are a diverse group and tend to have smaller distributions than other vertebrates, making them more likely to fall within IUCN threat thresholds (Stuart *et al.* 2004). Ninety-nine percent of threatened amphibians in the hotspot are restricted in distribution (<50,000 km2). Although they are threatened by habitat destruction, disease and climate change are possibly their greatest threats (Pounds *et al.* 2006).

Arthropods (insects and crustaceans)

The odonate insects, known as dragonflies or damselflies, include the family with the highest number of threatened arthropod species in the Tropical Andes (Coenagrionidae, 15 species). *Mesamphiagron* (seven species) is the genus with the most threatened species. It is endemic to the northern Andes, and its high Andean species live above 1,400 m above sea level. A dragonfly that has only been recorded from the páramos of Antioquia, *M. gaudiimontanum* (EN), whose name means “the joy of the mountains”, has lost an entire population due to the introduction of carp into the lagoon where it was breeding in Las Baldías-Valle de Aburrá, Colombia (Urquijo 2017). The second arthropod family with the highest number of threatened species in the hotspot are beetles (Escarabaeidae, seven species), a species-rich family of coleopteran insects of great importance for their role as recyclers, pollinators and seed dispersers (Carlson 2001).

Among the crustaceans, there is only one globally threatened species in the hotspot, *Hypolobocera barbacensis* (VU), a freshwater crayfish endemic to Colombia and found in five localities in Nariño. This species, which is consumed by indigenous Emberá communities, was affected by pollution from alluvial gold mining; however, this threat has been controlled by local conservation efforts (Campos *et al.* 2015).

The most common threats to threatened arthropod species in the hotspot, particularly vulnerable due to their restricted distribution and specific environmental requirements, are habitat loss and climate change (IUCN 2020). In addition, for some odonates, environmental pollution and destruction due to gold mining is a recurrent threat (IUCN 2020).

Birds

Among the Passeriformes, the families with the highest number of threatened species are woodcreepers and their related species (Furnariidae, 21 species), tanagers and their related species (Thraupidae, 21 species), flycatchers (Tyrannidae, 16 species) and antpittas (Grallariidae, 15 species). The most threatened non-passerine birds include hummingbirds (Trochilidae, 24 species) and parrots and macaws (Psittacidae, 23 species).

Although 89 percent of birds have distributions that transcend hotspot boundaries, 73 percent have restricted ranges (<50,000 km^2) and depend on forests that are being destroyed by accelerated deforestation for livestock, agricultural expansion, logging, fires and mining (IUCN 2020). Other natural habitats such as marshes and wetlands important for waterbirds, many of which are migratory, have been drained or destroyed for the same reasons (IUCN 2020). Parrots and macaws are a particularly threatened group due to the practice of keeping them captive for their colorful plumage or attractive song and behaviors. This encourages the removal of these birds from their habitat, species trafficking and, in turn, increases the risk of spreading invasive species.

Among the threatened macaws is the charismatic red-fronted macaw (*Ara rubrogenys*). Endemic to Bolivia, its natural habitat, the inter-Andean dry forest, is extensively affected by human activities (Miles *et al.* 2006). This species is Critically Endangered (CR), mainly due to habitat loss, wildlife trade, persecution as crop pests and the use of pesticides (BirdLife International 2018). There are also birds with a wide geographical distribution that are affected by the deforestation of primary forests. One such example is the crested eagle (*Spizaetus isidori*, EN), an Andean raptor with a range that extends from Venezuela to Argentina but is narrowly restricted to elevations between 1,500 and 2,800 m above sea level (BirdLife International 2016b; Fergusson-Lees *et al.* 2001). Species with very restricted ranges are also threatened. For example, the striking Jocotoco antpitta (*Grallaria ridgelyi*, EN), an undergrowth bird with a small known range in three rainforest localities in southern Ecuador and northern Peru, is found in areas affected by logging, cattle ranching and gold mining (BirdLife International 2016a; Heinz *et al.* 2005).

Bivalve molluscs and gastropods

The two globally threatened bivalve species in the Tropical Andes, *Acostaea rivolii* (CR) and *Diplodontites olssoni* (VU), are freshwater bivalve molluscs endemic to Colombia (families Etheriidae and Mycetopodidae). Threatened gastropods in the hotspot include families of small freshwater snails (Cochliopidae, three species; Hydrobiidae, one species), and the lagoon snails or giant snails (Ampullariidae, three species). The most common threats to these species are water pollution from agriculture or urbanization and the alteration of water bodies. The threatened gastropods of Lake Titicaca may also be affected by the invasive gastropod (*Haitia acuta*) and by fish species introduced for commercial fishing (IUCN 2020).

Fish

The number of threatened fish (77 species, Table 5.1) has increased considerably since the publication of the last ecosystem profile, which identified just seven globally threatened species (CEPF 2015). At present, the old river fishes or *corronchos* (Loricariidae, 20 species) are the most threatened fish family, belonging to the Siluriformes order (43 species). Commonly known as catfishes, they are mostly benthic, freshwater scavengers. The family with the second-highest number of threatened species is the Characidae (13 species) belonging to the Characiformes order (20 species), tropical lake fishes that include piranhas (non-threatened).

Thirty-eight percent of the threatened fishes in the hotspot have distributions that are entirely within the hotspot and have a range of less than 50,000 km^2. The only six Critically Endangered species with distributions entirely within the hotspot belong to the Siluriformes order, which has the highest number of threatened species. One of these, the Andean catfish (*Astroblepus ubidiai*), is restricted to isolated springs in Imbabura, Ecuador. This species is threatened by habitat deterioration caused by pollution and cattle grazing. Another Critically Endangered species, the pencil catfish (*Trichomycterus venulosus*) from Colombia, may be extinct as it has not been recorded since 1911 (IUCN 2020).

The greatest threats to fish in the Andes are water pollution and deforestation (IUCN 2020). Mining, agriculture, urbanization and illicit crops contribute to the pollution of lakes and rivers, and deforestation leads to erosion, reduction of shade, oxygen and food, as well as a change in water quality. This combination of factors represents a problem not only for aquatic biodiversity but also for human consumption. In Lake Titicaca, for example, several species of fish important for consumption were found to have elevated concentrations of mercury in muscle tissue according to US Environmental Protection Agency (EPA) criteria (Gammons *et al.* 2006). In addition, many of these fish have possibly been affected by the introduction of invasive trout and the construction of dams that modify the physico-chemical aspects of rivers (IUCN 2020).

Fungi

The only globally threatened fungus (*Stilbohypoxylon macrosporum*, CR) in the hotspot is an ascomycota fungus of the Xylariaceae family. It is known only to be found in the Argentinian yungas, a habitat degraded by citrus and sugar cane agriculture. Although it occurs in protected areas, there are no specific conservation actions for this organism (Kuhar *et al.* 2020).

Mammals

The majority of globally threatened mammals in the hotspot are rodents (31 species), primates (21 species) and bats (11 species). Among the most threatened families in these orders are the new world rats and mice (Cricetidae, 25 species), followed by the new world monkeys (Atelidae, seven species). Mammals are mostly affected by deforestation and habitat fragmentation due to agriculture and ranching. Poaching is also a frequent threat to mammals in the Tropical Andes (IUCN 2020).

Like birds, 80 percent of the identified threatened mammals have distributions beyond hotspot boundaries. Of the threatened small mammals, only 23 percent of rodents and 27 percent of bats have distributions restricted to the Tropical Andes. The Antioquian sac-winged bat (*Saccopteryx antioquensis,* EN), endemic to Colombia, is found in only two localities in Antioquia, where it lives and breeds in karst formations. It is threatened by recreational use and lack of control of tourist access and forests surrounding these karst formations are being transformed by agriculture (Solari 2016). Despite the benefits that bats offer humankind as pest controllers, pollinators and seed dispersers, they now face increased threat due to the belief that they are linked to the COVID-19 pandemic. In parts of the Andes and other places in the world, bats have been attacked, particularly with fire, in the mistaken belief that they can transmit the SARS-CoV-2 coronavirus to humans (Gomez 2020).

Marsupial mice (Caenolestidae) are a family of marsupials whose three threatened species are all endemic to the Andes. They are the only family of the paucituberculate order with living species restricted to humid and cold environments in discontinuous areas of the Andes from Venezuela to southern Chile (Ojala-Barbour *et al.* 2013). The three threatened species in the Tropical Andes are part of a group of six surviving paucituberculate species and belong to the genus *Caenolestes*, which is itself one of three surviving genera in this family.

Among the 21 globally threatened primates whose distributions coincide with the hotspot is the yellow-tailed woolly monkey (*Lagothrix flavicauda*, CR), a large atelid endemic to the cloud forests of the Peruvian Andes, first described by Alexander von Humbolt in 1812 (Serrano-Villavicencio *et al.* 2019). Among the threatened large mammals, the mountain tapir (*Tapirus pinchaque*, EN), the smallest of the South American tapirs, is the largest restricted to the hotspot. With fewer than 2,500 individuals thought to remain in its range from Colombia to northern Peru, its populations continue to decline due to a myriad of threats, including hunting, habitat loss, the introduction of cattle ranching, mining, settlement of a growing human population and climate change (Lizcano 2016). The emblematic spectacled bear (*Tremarctos ornatus*, VU) ranges along the Andean cordillera from Venezuela to Bolivia. The species continues to decline due to habitat loss, intervention and fragmentation, limiting the ability to sustain populations, compounded by poaching for human conflict or cultural purposes, mining and climate change (Velez-Liendo 2017).

Plants

A recent IUCN assessment of the hotspot's plants, funded by CEPF, described a total of 330 globally threatened species (Table 5.1) belonging to the dicotyledons (Magnoliopsida), monocotyledons (Liliopsida) and some fern-like aquatic lycophytes (Lycopodiopsida). The dicotyledon family with the highest number of threatened species is Ericaceae (86 species) of the Ericales order. These are woody plants with very diverse centers of endemism above 2,600 m above sea level (CEPF 2015). This is followed by the Asteraceae (66 species), dicotyledons of the Asterales order, in which the frailejones of the *Espeletia* (38 species) and *Espeletiopsis* genera (11 species) stand out as very representative and important plants of the páramos of the northern Andes.

Among the monocotyledons, the bromeliad family (Bromeliaceae, 66 species) of the Poales order has many threatened species. The genus *Puya* is the most threatened (47 species). It is characterized by herbaceous high mountain plants that are slow-growing and take years to flower, some of which have erect stems that can reach up to 3 meters in length. The largest puya, *Puya raimondii* (EN), is a species endemic to the Altiplano of Bolivia and Peru. It can grow up to 14 m with its inflorescence and erect stem. It takes several decades to flower, and its nectar is an important resource for Andean hummingbirds (Zavaleta 2017). However, this species was not considered in this work as it does not currently have a digital distribution map on the IUCN Red List. Finally, for the lycophytes there are six threatened species, isoethaceae (Isoetaceae) of a single *Isoetes* genus. These are seedless, aquatic or semi-aquatic vascular plants, popularly known as aquatic ferns, which have their center of taxonomic diversity in South America with 64 of the 250 species known worldwide (Pereira *et al.* 2017).
Seventy-four percent of threatened plants in the Tropical Andes have distributions that are entirely within the hotspot. Perhaps this is because recent IUCN assessments have concentrated on examining plants from ecosystems characteristic to the hotspot. Plants have been mostly affected by deforestation, habitat degradation and loss related to the expansion of the agricultural frontier, cattle ranching and mining (IUCN 2020). In addition, many of these Andean plants are found in high altitude ecosystems that are potentially severely threatened by climate change-related alterations in temperature and precipitation (Young *et al.* 2011).

Reptiles

As in the case of fish and plants, the number of threatened reptiles (125 species, Table 5.1) has increased considerably in recent years. The most threatened reptiles belong to the most diverse family of lizards in the Neotropics, the gymnophthalmids (Gymnophthalmidae, 34 species), generally small lizards with short limbs. The most threatened genus (*Riama*, 19 species) is distributed mainly in the northern Andes (Torres-Carvajal *et al.* 2016). Some gymnophthalmids, such as *Proctoporus*, have a transparent lower eyelid (Köhler and Lehr 2004). The only threatened lizard of this genus in the Tropical Andes is *P. cephalolineatus* (EN), found in the montane forests of Venezuela (IUCN 2020). The second most threatened family corresponds to the non-venomous snakes (Dipsadidae, 18 species), including *Emmochliophis miops* (CR), a snake with particularly small eyes, to which its specific name alludes (Pazmiño-Otamendi 2019).

Sixty-two percent of the Tropical Andes' threatened reptiles are restricted to the hotspot. Most Andean reptiles have restricted distributions that are shrinking due to habitat destruction caused by the expansion of the agricultural frontier (IUCN 2020). In addition to contributing to the destruction of Andean reptile habitat through water pollution, mining affects reptiles associated with riparian zones such as *Anolis podocarpus* (VU). Finally, species that inhabit páramos and Andean forests such as *Anadia brevifontalis* (EN) or that live among the leaf litter of humid forests such as *Lepidoblepharis conolepis* (CR) could be threatened by climate change, which reduces humidity below their required levels (IUCN, 2020).

Species Conclusions

The list of globally threatened species in the Tropical Andes is dominated by vertebrates. Vertebrates in the Andes exhibit higher levels of endemism than in other hotspots (Myers *et al.* 2000). The estimated percentage of described vertebrate species that have been assessed by the IUCN globally (73 percent) significantly exceeds invertebrates (2 percent), plants (10 percent) and fungi and protists (0.3 percent). Of the vertebrates, birds (100 percent), mammals (91 percent) and amphibians (84 percent) have the highest percentages of described species assessed by IUCN. In comparison, reptiles (70 percent) and fish (59 percent) still require further coverage (IUCN 2020).

These species are subject to a large number of pressures related, directly or indirectly, to human activities that seriously threaten their survival. The Tropical Andes has a long history of human settlement that has transformed the region's habitats and caused deforestation through the expansion of agriculture and pastures. These settlements are concentrated in the Andean and inter-Andean valleys, and have caused a significant loss of biodiversity, particularly in the northern Andes (Wassenar *et al.* 2007). Habitat loss and degradation remain the most important threats to most of its taxonomic groups.

Amphibians have suffered the greatest loss of biodiversity attributed to a pathogen (Scheele *et al.* 2019). Trade and human development have broken down the dispersal barriers of *Batrachochytrium dendrobatidis* and *B. salamandrivorans*, allowing an accelerated spread of these fungi around the world, an event known as a panzootic. The impacts of chytridiomycosis have been greatest for anurans with restricted ranges in humid climates and high elevations, particularly in the Americas and Australia (Scheele *et al.* 2009). Addressing this amphibian fungal panzootic is a challenge in the face of globalization because it requires biosecurity measures that are almost non-existent in protected areas, let alone outside protected areas, and are inadequate in international trade policies. No effective strategies have been found to mitigate the disease in the wild. Moreover, doing so requires combined and innovative solutions as other threats, such as tourism and climate change, may exacerbate the spread and impact of the disease. Improving protection, management and biosecurity protocols for sites with surviving amphibian populations that may be resistant to the disease, and thus the founders of future populations, is an urgent priority.

Other extremely biodiverse groups in the Tropical Andes, such as plants and invertebrates, have fewer threatened species. Despite being the hotspot with the highest plant endemism and the fact that there have been recent CEPF-supported IUCN Red List plant assessments, assessing the totality of species is a major challenge (Myers *et al.* 2000). However, efforts in recent years have succeeded in illustrating the importance of key ecosystems, such as the yungas, puna and páramos, for biodiversity and the provision of ecosystem services to human communities in the Tropical Andes.

The growing number of threatened species in the Tropical Andes and worldwide and the trend of species population decline are indicative of the health of our ecosystems, and the planet is giving us important warning signs (WWF 2020). The Living Planet Index shows a 68 percent drop in the population size of vertebrates monitored around the world between 1970 and 2016 (WWF 2020). In the tropical regions of the Americas, there has been a 94 percent decline, the largest observed in any region of the world. The impacts of the COVID-19 pandemic have included increases in activities such as mining and subsistence hunting, along with a decrease in the control and monitoring of protected areas. The latter is due to isolation or a reduction in the number of park rangers, which could have serious implications for species (see Chapter 6 for more details). However, the pandemic has also shown us that we live in fragile harmony with nature and that to care for nature is to ensure our own health and well-being.

5.2 Site Outcomes

The KBA program uses a global standard that provides a set of quantitative criteria and thresholds for identifying sites in an objective, repeatable and transparent way (IUCN 2016, KBA Standards and Appeals Committee 2020). Species qualify KBAs by demonstrating that the sites meet specific thresholds of criteria based on threatened biodiversity, geographically restricted biodiversity, ecological integrity of ecosystems, biological processes of species and irreplaceability of the sites through quantitative analysis. Currently, the Tropical Andes Hotspot has a total of 474 KBAs, 423 confirmed and 51 nominated or proposed as of August 2020 (Table 5.2, Appendix 5. 2). These include 359 Important Bird Areas (IBAs) and 103 Alliance for Zero Extinction (AZE) sites, which are defined as sites that encompass the entire distributions of Endangered or Critically Endangered species (Ricketts *et al.* 2005).

Most KBAs in the Tropical Andes had previously been defined as IBAs by BirdLife International and its partner organizations in each country. Until the introduction of KBAs, no important areas for plant and reptile conservation had been identified in the region, with the exception of AZE sites. However, the KBA Standard (formally the Global Standard for the Identification of Key Biodiversity Areas) allows for the identification of sites important for all macroscopic biodiversity at the species and ecosystem level. In the 2015 ecosystem profile, CEPF recognized the importance of other taxonomic groups for the identification of new KBAs and identified information gaps regarding the representation of these taxonomic groups in assessments of globally threatened species (CEPF 2015). Consequently, in its last investment period, CEPF supported IUCN Red List of Threatened Species assessments of 614 endemic plants in the hotspot and the updating of KBAs to incorporate Red Listed plants and reptiles. This process enabled the updating of qualifying species information for 109 KBAs and generated 50 new KBAs for plants and reptiles for sites in Colombia, Ecuador, Peru and Bolivia (Table 5.2).

Table 5.2. Summary of Site Outcomes for the Tropical Andes Hotspot

Country	Number of KBAs* (nominated/ proposed)	KBA area (ha)	Area of KBA within the hotspot (ha)	Area of country within the hotspot (ha)	Percentage of the hotspot area covered by KBAs
Argentina	76	4,302,130	2,398,807	14,872,835	16
Bolivia	47 (7)	6,777,212	6,664,450	37,000,978	18
Chile	12	586,998	495,771	7,384,220	7
Colombia	119 (14)**	7,878,654	6,743,033	35,028,997	19
Ecuador	88 (16)	4,708,664	4,275,071	11,786,708	36
Peru	106 (14)	14,393,717	9,344,586	45,326,966	21
Venezuela	26	4,349,607	2,588,751	6,952,395	37
Tropical Andes Hotspot	474 (51)	42,996,982	32,510,468	158,353,100	21

( ) In brackets, KBAs nominated/proposed.
**Between August 2020 and December 2020, a new KBA was nominated for Colombia that has not been included in these calculations.

The publication of the KBA Standard triggered a process of updating and re-evaluating sites to verify the distribution of qualifying species, redefine boundaries and ensure that KBAs meet current criteria (IUCN 2016). CEPF also supported an update of the boundaries of 35 KBAs in the hotspot by the regional KBA Focal Point for Latin America and the Caribbean (D. Díaz pers. comm.). As a result of the application of the new KBA Standard, 63 KBAs were removed from the 2015 list of 442 sites and 95 added for a current total of 474 KBAs in the Tropical Andes Hotspot (Appendix 5.3). These 474 sites cover 32,510,468 hectares within the hotspot, or one-fifth of the hotspot, an area slightly larger than Norway (Table 5.2). The Tropical Andes KBAs have an average area of 90,710 hectares but range from 63 hectares to 2,184,234 hectares, with Utuana-Bosque de Hanne (ECU73) in Ecuador being the smallest KBA and Cordillera Vilcabamba (PER33) in Peru the largest.

In order to determine the relative importance of KBAs in the hotspot, the ecosystem profile used an irreplaceability index that assigns values to the hotspot according to species range and threat category (Appendix 5.4, Table A5.4.1). The normalized sum of values over the area is what we call the relative biodiversity value (RBV). The profile used the species range information available from the IUCN and included all species in some global threat category: Critically Endangered (CR), Endangered (EN) or Vulnerable (VU). The RBV establishes, for example, higher relative values to areas where Critically Endangered species with smaller ranges are found and lower relative values to areas where Vulnerable species with larger ranges are found. The section below provides a summary overview of the hotspot's KBAs, with a description of the highest RBV sites for each country.

Overview of KBAs

Venezuela

Venezuela is the country with the second-lowest number of KBAs, with 26 sites (Figure 5.1), covering an area of 2,588,751 hectares or 37 percent of the Venezuelan section of the hotspot (Table 5.2). This country has the highest percentage of the hotspot covered by KBAs of any Andean country. The previous ecosystem profile (CEPF 2015) identified 27 KBAs; four KBAs have been removed, and three added (Appendix 5.3). In Venezuela, KBAs have an average area of 167,292 hectares, ranging from 8,202 hectares to 725,740 hectares (Table 5.3).

The KBA with the highest relative biodiversity value (RBV - 0.36) for the country is the Parque Nacional Península de Paria (VEN20), located at the northeastern end of the Tropical Andes Hotspot, in the state of Sucre (Figure 5.1 Map B). In the north-eastern mountainous region of the Coastal Range is the Zona Protectora Macizo Montañoso del Turimiquire (VEN26) and, to the east of this, the Parque Nacional El Guácharo (VEN5). The Macizo Montañoso del Turimiquire is a mountain with elevations up to 2,600 m above sea level. Important rivers originate there, and several hydraulic projects and aqueducts ensure water supply to the northeastern and insular regions of Venezuela (BirdLife International 2020d).

In the Cordillera de la Costa Central Corridor (Figure 5.1 Map A and B) the following six KBAs with the next highest RBVs for the country (0.35-0.25) are grouped: Monumento Natural Pico Codazzi (VEN3), Parque Nacional Macarao (VEN10), Parque Nacional Henri Pittier (VEN9), Parque Nacional El Ávila y alrededores (VEN2), Parque Nacional San Esteban (VEN13) and Palmichal (VEN28). These low-elevation coastal mountains are geologically older and biologically more closely related to the Caribbean than the Andes. These sites have high endemism and threats and provide valuable ecosystem services such as water supply and carbon storage. The last remaining population of Venezuela's only species of Veragua stubfoot toad (*Atelopus cruciger*, CR) is found in this area. Parque Nacional Henry Pittier (VEN9) is an AZE site classified by the Aragua poison frog (*Mannophryne neblina*, CR). The easternmost population of helmeted curassow (*Pauxi pauxi*, EN) occurs in this area, where it needs to be protected from hunting. Most of these KBAs, with the exception of Palmichal (VEN28), are or form part of protected areas that provide some security against severe deforestation, but their proximity to Caracas and other population centers constitutes a fragmentation risk (Figure 5.9, Table 5.3).

The Parque Nacional Sierra La Culata (VEN14), the Parques Nacionales Sierra La Culata y Sierra Nevada y alrededores (VEN23), and Parque Nacional Sierra Nevada (VEN15) are large KBAs in the Venezuelan Andes Corridor that protect Andean páramos and upper montane forests and possess high levels of endemic plants (Figure 5.1 Map A). This area has not suffered from significant land-use change, infrastructure development pressure or agricultural expansion. The parks provide ecosystem services such as ecotourism and water supply for hydropower production and consumption in the state of Mérida, which has a population of 992,000. Within the same corridor, and immediately to the northeast of this grouping are two small KBAs also of medium-high RBV (0.29-0.24): Parque Nacional Guaramacal (VEN7) and Tostós (VEN25), and to the southwest there are KBAs of medium-high RBV (0.23 both): Parque Nacional Páramos Batallón y La Negra y alrededores (VEN21) y el Parque Nacional El Tamá (VEN6).

Finally, on the northernmost branch of the Andes west of Lake Maracaibo is the binational corridor Cordillera de Perijá (Figure 5.1 Map A). On the Venezuelan side of the corridor are the Parque Nacional Perijá (VEN12), with a high RBV (0.31), and the Zona Protectora San Rafael de Guasare (VEN27), with a medium-high RBV (0.26). The Perijá mountain range, shared with Colombia, is an area of great diversity and endemism mostly covered by montane and submontane forests and páramos from 2,800 m above sea level. The area also includes valleys, such as the Guasare river valley, at the eastern end of the Zona Protectora San Rafael de Guasare (VEN27), a KBA that protects water sources for the city of Maracaibo and other population centers (BirdLife International 2020a, 2020e).

Figure 5.1. KBAs in the Venezuelan Region of the Tropical Andes Hotspot

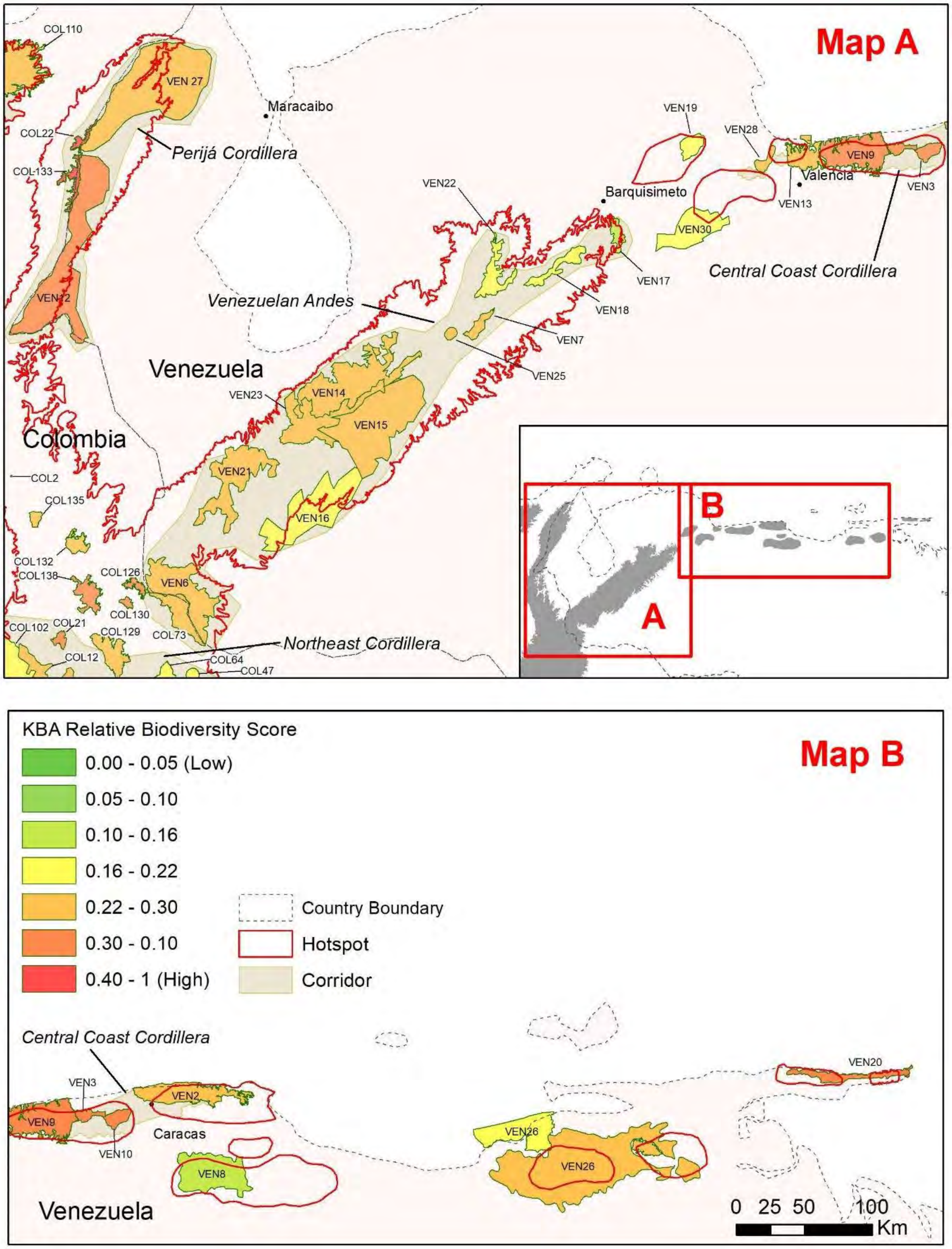


Table 5.3. KBAs in Venezuela

KBA name	CEPF code	Area (ha)	Protection*	Corridor	RBV	Other
Monumento Natural Pico Codazzi	VEN3	15,343	Protected	Cordillera de la Costa Central	0.35	IBA
Palmichal	VEN28	15,649	Not protected	Cordillera de la Costa Central	0.25	IBA
Parque Nacional El Ávila y alrededores	VEN2	115,129	Partially protected	Cordillera de la Costa Central	0.28	IBA AZE
Parque Nacional El Guácharo	VEN5	46,190	Partially protected	-----	0.28	IBA
Parque Nacional El Tamá	VEN6	160,881	Partially protected	Venezuelan Andes	0.23	IBA AZE
Parque Nacional Guaramacal	VEN7	21,313	Protected	Venezuelan Andes	0.29	IBA
Parque Nacional Guatopo	VEN8	156,405	Partially protected	-----	0.15	IBA
Parque Nacional Henri Pittier	VEN9	137,246	Protected	Cordillera de la Costa Central	0.31	IBA AZE
Parque Nacional Macarao	VEN10	21,830	Protected	Cordillera de la Costa Central	0.34	IBA
Parque Nacional Mochima	VEN29	124,455	Protected	-----	0.20	IBA
Parque Nacional Páramos Batallón y La Negra y alrededores	VEN21	169,596	Partially protected	Venezuelan Andes	0.23	IBA AZE
Parque Nacional Península de Paria	VEN20	50,489	Partially protected	-----	0.36	IBA AZE
Parque Nacional Perijá	VEN12	374,807	Protected	Cordillera de Perijá	0.31	IBA AZE
Parque Nacional San Esteban	VEN13	55,570	Protected	Cordillera de la Costa Central	0.27	IBA
Parque Nacional Sierra La Culata	VEN14	244,428	Protected	Venezuelan Andes	0.25	IBA
Parque Nacional Sierra Nevada	VEN15	337,605	Protected	Venezuelan Andes	0.22	IBA
Parque Nacional Tapo-Caparo	VEN16	226,536	Protected	Venezuelan Andes	0.19	IBA
Parque Nacional Terepaima	VEN17	22,377	Partially protected	Venezuelan Andes	0.12	IBA
Parque Nacional Tirgua (General Manuel Manrique)	VEN30	113,662	Protected	-----	0.18	IBA
Parque Nacional Yacambú	VEN18	39,692	Partially protected	Venezuelan Andes	0.17	IBA
Parque Nacional Yurubí	VEN19	29,690	Protected	-----	0.20	IBA
Parques Nacionales Sierra La Culata y Sierra Nevada y alrededores	VEN23	725,740	Partially protected	Venezuelan Andes	0.24	AZE
Refugio de Fauna Silvestre y Reserva de Pesca Parque Nacional Dinira	VEN22	57,534	Protected	Venezuelan Andes	0.17	IBA AZE
Tostós	VEN25	8,201	Not protected	Venezuelan Andes	0.24	AZE
Zona Protectora Macizo Montañoso del Turimiquire	VEN26	604,645	Not protected	-----	0.27	IBA AZE

Zona Protectora San Rafael de Guasare	VEN27	474,581	Not protected	Cordillera de Perijá	0.26	IBA

* Protected: > 80 percent overlap with a protected area.
Partially protected: 10-80 percent overlap.
Not Protected: < 10 percent overlap. See the section 5.4 on protection of KBA for more information on designations.

Colombia

As of August 2020, Colombia had more KBAs (119) than any other Andean country (Figures 5.2a and 5.2b) in the hotspot, yet its KBAs, with a combined area of 6,743,033 hectares, cover just one-fifth of the Colombian section of the hotspot (Table 5.2). The Colombian KBAs have an average area of 66,207 hectares, ranging from 122 hectares to 816,648 hectares (Table 5.4). In the previous ecosystem profile, 121 KBAs were identified in Colombia; in this update, 18 have been removed, and 16 added (Appendix 5.3). The high RBV KBAs in the country are located in the Cordillera Occidental, Cordillera Central and Cordillera Oriental, as well as in the Sierra Nevada de Santa Marta. However, the highest concentration of KBAs with the highest RBV for Colombia is found in the Cordillera Central, followed by the Cordillera Occidental.

In the Sonsón-Nechi Corridor (Figure 5.2a), north of the Cordillera Central, on the eastern slope, is Selva de Florencia (COL101), a KBA with high RBV (0.43) and an AZE site. It constitutes the last fragment of Andean rainforest in this mountainous area (BirdLife International 2020c). It has a high amphibian species richness, with 22 threatened species, including four Critically Endangered frogs of the genus *Pristimantis,* that have very restricted distributions, and the entire known population of the Endangered *Pristimantis actinolaimus*. To the northwest, in the department of Antioquia, in the same corridor of the Cordillera Central, are the Páramos del Sur de Antioquia (COL59) and Páramo de Sonsón (COL57), an area encompassing páramo and Andean forest habitats where 19 threatened amphibians are found, including *Atopophyrnus syntomopus* (CR), a frog with a very restricted distribution.

Around Parque Nacional Natural Los Nevados, in the Cordillera Central, is the Noreste de Quindío Corridor (Figure 5.2b). This corridor includes the seven KBAs with the highest RBVs (0.53-0.45) for Colombia (Table 5. 4): Alto Quindío (COL6), Finca la Betulia Reserva la Patasola (COL37), Reserva Natural Ibanasca (COL87), Cuenca del Río Toche (COL32), Bosques del Oriente de Risaralda (COL10), Cañón del Río Combeima (COL15), and Reserva Hidrográfica Forestal y Parque Ecológico de Río Blanco (COL84). Surrounding them, and in the same grouping, are two KBAs of high RBV (0.42 and 0.37): Cañón del Río Barbas y Bremen (COL14) and Finca Paraguay (COL38). This grouping of KBAs is part of the departments of Caldas, Quindío, Risaralda and Tolima and surrounds the snow-capped mountains of Ruiz, Tolima and Santa Isabel. The KBA Bosques de Oriente de Risaralda (COL10) is of great importance for water regulation in the region, which includes Pereira, the capital of Risaralda, the most populated city in the coffee-growing region, with around 481,129 inhabitants. The area includes Andean forests important for species such as the indigo-winged parrot (*Hapalopsittaca fuertesi*, CR) and in some places there are wax palm (*Ceroxylon quinduense*) forests that provide important habitat for the yellow-eared parrot (*Ognorhynchus icterotis*, EN). It also includes the Laguna del Otún, a Ramsar site, which is an important habitat for waterbirds. Compared to the previous ecosystem profile, this grouping of KBAs demonstrates a higher RBV, which could be attributed to recent updates or assessments of threatened species. Of the 68 threatened amphibians, arthropods, birds, fish, plants and reptiles in these KBAs, 49 have last been assessed between 2014 and 2020. Although all KBAs are under some form of protection, with the exception of the Cañón del Río Combeima (COL15), they are threatened by agriculture, cattle ranching, mining, urban expansion, road infrastructure, disorganized tourism and forest fires. Nearby, to the northeast of these KBAs, is the KBA Vereda el Llano

(COL117), an area that forms part of the habitat of frog species with very restricted distribution, such as *Andinobates dorisswansonae* (VU) and *A. tolimensis* (VU). Creative conservation actions are needed in this area to ensure the frog's survival, as ecotourism may pose a risk to threatened amphibians.

The Laguna de la Cocha (COL50), Valle de Sibundoy and Laguna de la Cocha (COL115) KBAs, with RBVs of 0.34 and 0.32 respectively, are located south of the Cordillera Central in the La Victoria-La Cocha-Sibundoy Corridor (Figure 5.2b). These KBAs, together with those further north, Serranía de los Churumbelos (COL105), Parque Nacional Natural Cueva de los Guácharos (COL62), Reserva Natural Meremberg (COL90), Reserva El Oso (COL82), Parque Nacional Natural Puracé (COL70) and Serranía de las Minas (COL103), are part of the Colombian Massif, where some of the most important rivers of the country originate, namely Patía, Cauca, Magdalena, Putumayo and Caquetá. The massif also includes several lagoons, including the Laguna de la Cocha Ramsar site, which is important for aquatic birds. It is a transition zone between the Andes and the jungles of the Amazon basin. The massif is covered by montane forests and lowland montane rainforests with a great diversity of threatened mammals, amphibians and birds. La Victoria (Nariño) (COL122) is located further south of the Cordillera Central, on the border with Ecuador, in a rural farming area with fertile unprotected soil where tributaries of the Putumayo and other rivers of the Pacific slope originate. The narrow distribution of the Chingual River Valley tree frog, *Hyloscirtus pantostictus* (CR), in Colombia falls within this KBA. Additionally, *Atelopus gigas* (CR) is known from only one locality in La Victoria, which was confirmed as an AZE site in 2018 (Key Biodiversity Areas Partnership 2020). All KBAs in the southern Cordillera Central are part of a highly transformed landscape where urban expansion, cattle grazing, and coffee and other plantations have modified the landscape for at least 100 years. This makes the protection of several of these KBAs important for the water supply for a region with extensive agricultural activity and high human population density. In addition, the high RBV KBAs in the Cordillera Central, as a whole, are part of the distribution of 84 Endangered and Critically Endangered species.

Three high RBV KBAs (0.42 - 0.34) are located in the Awá-Cotacachi-Illinizas binational corridor (Figure 5.2b) of the southern region of the Cordillera Occidental in Colombia. These are Reserva Natural La Planada (COL88), under the administration of the Awá indigenous community; the Reserva Natural Río Nambí (COL91); and the bordering La Reserva Natural El Pangán (COL86). These KBAs include forests and rainforests on the Pacific slope that connect to the Tumbes-Chocó-Magdalena Hotspot, another hotspot where CEPF invested between 2002 and 2013. The lower elevations of the slope overlap with the distribution ranges of mammals such as the black-headed spider monkey (*Ateles fusciceps*, CR), and other widely distributed vulnerable mammals such as the spectacled bear (*Tremarctos ornatus*, VU), a large number of bats as well as smaller rodents with a more restricted distribution.

Along the Cordillera Occidental there is a chain of high RBV KBAs in the Paraguas-Munchique-Bosques Montanos del Sur de Antioquia Corridor (Figures 5.2a and 5.2b) that encompasses KBAs from the Serranía del Pinche (COL109) in the south, to the Bosques Montanos del Sur de Antioquia (COL11) in the north. These KBAs also include warm, humid forests of the Pacific slope, Andean forests and páramos that are part of the distribution of 86 Endangered and Critically Endangered species. Serranía del Pinche (COL109) is south of the Parque Nacional Natural Munchique y extensión sur (COL67), which is a KBA with the confirmed presence of very restricted and threatened amphibians.

In the same corridor, the Parque Nacional Farallones de Cali (COL65) supplies water to the hydroelectric installations that contribute to Cali's energy supply (along with the Salvajina dam). The Enclave Seco del Río Dagua (COL36), which lies between the Bosque de San

Antonio/Km 18 (COL7) and the Alto Calima Region (COL80), is characterized by dry forest and xerophytic scrub due to a rain shadow that causes a dry climate not typical of the mountain range. These sites are largely affected by the road to Buenaventura, the highway to the Colombian Pacific, human occupation and long-term agricultural use. The Parque Nacional Regional Páramo del Duende (COL75), where the Calima, Bravo, Azul and Frío rivers are born, is another páramo area in this range located on the cordillera. It comprises grasslands and various types of grasses that dominate its small valleys, as well as vegetation typical of shallow, flooded moorland soils (BirdLife International 2020b).

The Serranía de los Paraguas (COL106) and Parque Nacional Natural Tatamá (COL74) include cloud forest in good condition; the páramo ecosystem is also present in the national park. However, the National System of Protected Areas (SINAP by its acronym in Spanish) reports that Afro-descendant communities carry out artisanal gold mining and subsistence agriculture in the KBA. Information on the level of threat to these KBAs is contradictory. On the one hand, it is considered an example of a well-managed area with both public and private protected areas. On the other hand, it has a history of deforestation, agriculture and pastoral activities on soils unsuitable for cattle ranching, coupled with planned roads that make it more accessible to human colonization and deforestation. There are also security problems in the area.

The northernmost KBAs of the Western Cordillera, with slopes towards the Chocó, are the Bosques Montanos del Sur de Antioquia (COL11). These are located next to Alto de Pisones (COL5) and La Empalada (COL45), the latter being home to the amphibian species *Pristimantis mars* (CR), whose distribution is confined to the site. Above the northern limit of the Paraguas-Munchique-Bosques Montanos del Sur de Antioquia Corridor, in the northern region of the Western Cordillera, in the department of Antioquia, are the Parque Nacional Natural Las Orquídeas (COL66), Páramo Urrao (COL58) and Orquídeas-Musinga-Carauta (COL56) KBAs. The area, which comprises the corridor and the afore-mentioned KBAs, includes the fragmented distribution of threatened endemic birds such as the gold-ringed tanager (*Bangsia aureocincta*, EN) and the Munchique wood wren (*Henicorhina negreti*, VU).

In the far north of the country (Figure 5.2a) is the Parque Natural Nacional Sierra Nevada de Santa Marta y sus alrededores (COL110). Located along the Caribbean coast, the Sierra Nevada is the world's highest coastal massif (5,775 m above sea level). It has been designated a Biosphere Reserve, a protected area of global importance for biodiversity conservation because it is home to several endemic species as a result of its isolation from the Andes mountain range. Threats in the Sierra Nevada de Santa Marta and the surrounding KBA include habitat destruction from illicit drug cultivation. The Kogi and Arhuaco indigenous groups administer much of the area, and if they maintain their traditional lifestyles, they may be the greatest allies of biodiversity conservation. Beyond the mountain itself, some 1.2 million people, mainly in the city of Santa Marta, depend on the freshwater supply that drains down from the Sierra Nevada's river basins.

Figure 5.2a KBAs in the Northern Colombian Region of the Tropical Andes Hotspot

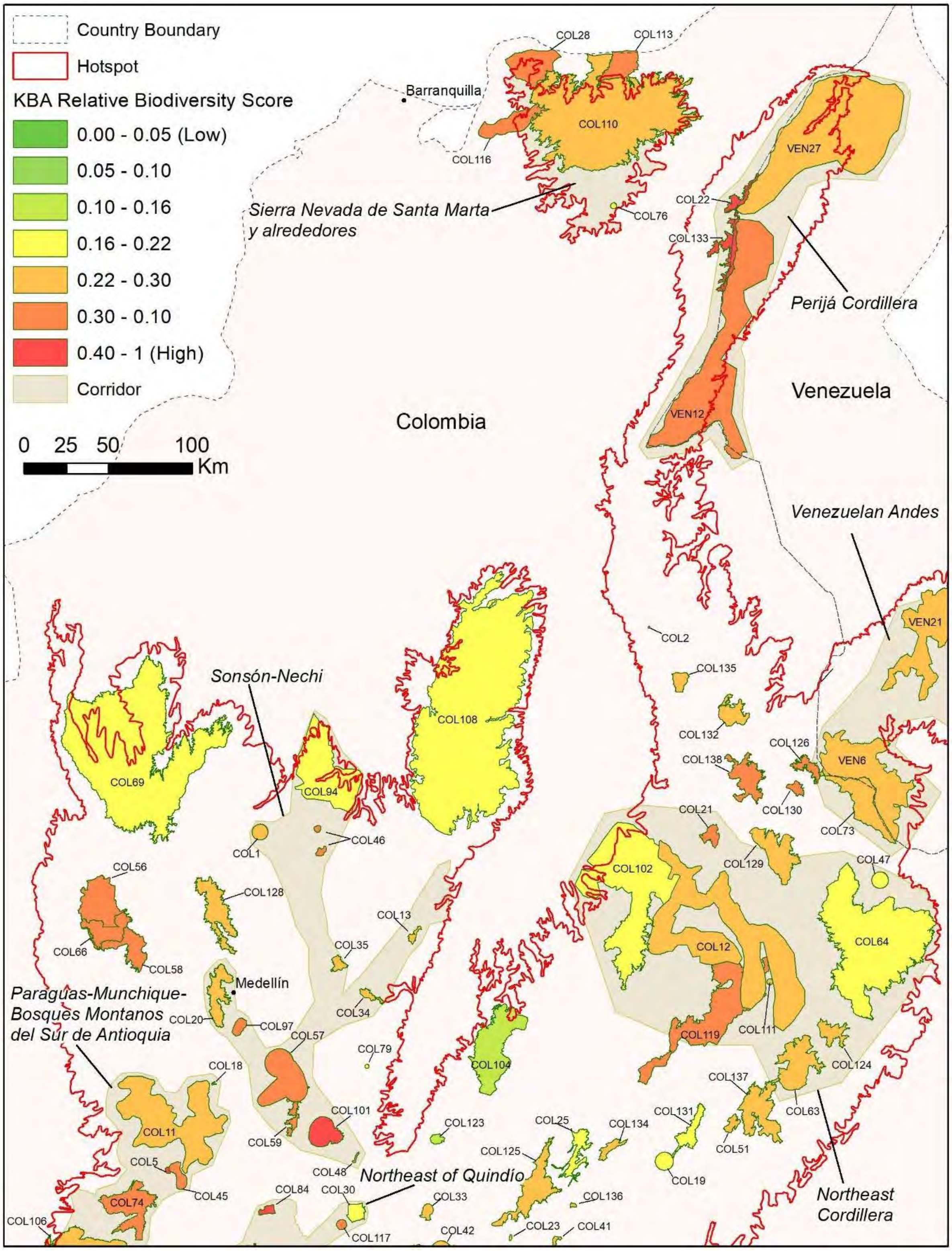


Figure 5.2b KBAs in the Southern Colombian Region of the Tropical Andes Hotspot

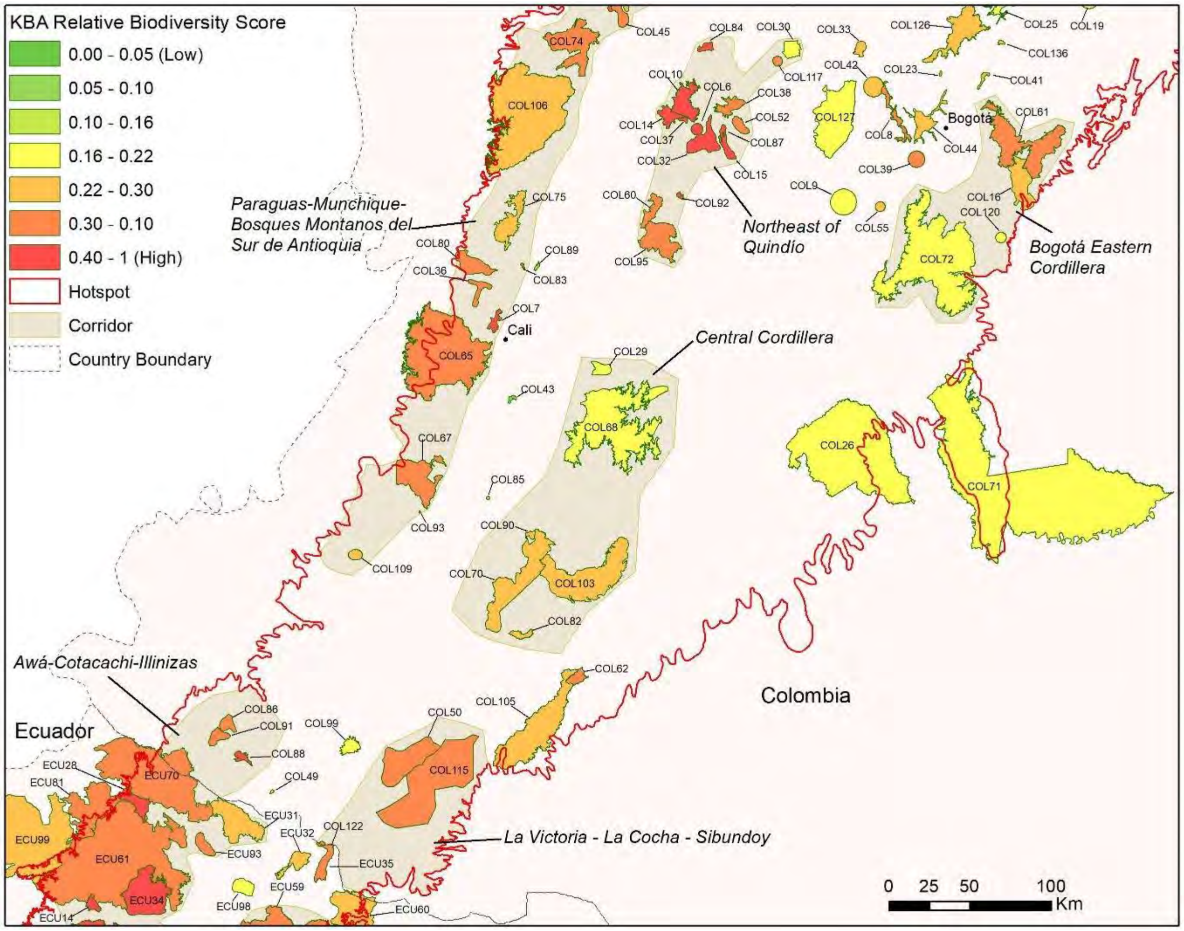


Table 5.4. KBAs in Colombia

KBA name	CEPF code	Area (ha)	Protection*	Corridor	RBV	Other
9 km sur de Valdivia	COL1	8,175	Partially protected	Sonsón-Nechi	0.28	AZE
Agua de la Virgen	COL2	122	Not protected	-----	0.24	IBA
Alto de Pisones	COL5	1,380	Not protected	Paraguas-Munchique-Bosques Montanos del Sur de Antioquia	0.44	IBA
Alto Quindío	COL6	4,582	Protected	Noreste de Quindío	0.53	IBA
Bosque de San Antonio/Km 18	COL7	5.993	Partially protected	Paraguas-Munchique-Bosques Montanos del Sur de Antioquia	0.42	IBA
Bosques de la Falla del Tequendama	COL8	12,598	Protected	-----	0.31	IBA
Bosques de Tolemaida, Piscilago y alrededores	COL9	22,758	Not protected	-----	0.19	IBA
Bosques del Oriente de Risaralda	COL10	27,610	Protected	Noreste de Quindío	0.46	IBA

Bosques Montanos del Sur de Antioquia	COL11	200,574	Partially protected	Paraguas-Munchique-Bosques Montanos del Sur de Antioquia	0.24	IBA
Bosques Secos del Valle del Río Chicamocha	COL12	395,012	Partially protected	Norte de la Cordillera Oriental	0.23	IBA
Cafetales de Támesis	COL18	263	Not protected	Paraguas-Munchique-Bosques Montanos del Sur de Antioquia	0.22	IBA
Cañón del Río Alicante	COL13	3,271	Partially protected	Sonsón-Nechi	0.29	IBA
Cañón del Río Barbas y Bremen	COL14	11,193	Protected	Noreste de Quindío	0.42	IBA
Cañón del Río Combeima	COL15	7,588	Not protected	Noreste de Quindío	0.45	IBA
Cañón del Río Guatiquía	COL16	34,913	Partially protected	Cordillera Oriental-Bogotá	0.29	IBA AZE
Caparrapi†	COL123	4,117	Not protected	-----	0.15	
Carretera Ramiriqui-Zetaquira	COL19	10,433	Partially protected	-----	0.23	AZE
Cerro de Pan de Azúcar	COL20	33,010	Protected	Sonsón-Nechi	0.29	AZE
Cerro La Judía	COL21	10,221	Partially protected	Norte de la Cordillera Oriental	0.38	IBA
Cerro Pintado (Serranía de Perijá)	COL22	11,878	Protected	Cordillera de Perijá	0.41	IBA AZE
Cerros Occidentales de Tabio y Tenjo	COL23	472	Not protected	-----	0.27	IBA
Complejo Lacustre de Fúquene, Cucunubá y Palacio	COL25	22,248	Protected	-----	0.21	IBA
Corredor Pisba-Cocuy†	COL124	17,700	Not protected	Norte de la Cordillera Oriental	0.24	
Cuchilla de San Lorenzo	COL28	71,600	Protected	Sierra Nevada de Santa Marta y alrededores	0.37	IBA
Cuenca del Río Hereje	COL29	8,258	Protected	Cordillera Central	0.20	IBA
Cuenca del Río Jiménez	COL30	10,465	Not protected	Noreste de Quindío	0.20	IBA
Cuenca del Río San Miguel	COL31	8,882	Protected	Cordillera Central	0.18	IBA
Cuenca del Río Toche	COL32	24,477	Partially protected	Noreste de Quindío	0.50	IBA
Cuenca Hidrográfica del Río San Francisco y sus alrededores	COL33	5,560	Partially protected	-----	0.23	
Embalse de Punchiná y su zona de protección	COL34	5,068	Protected	Sonsón-Nechi	0.27	IBA
Embalse de San Lorenzo y Jaguas	COL35	6,033	Protected	Sonsón-Nechi	0.28	IBA
Enclave Seco del Río Dagua	COL36	8,509	Partially protected	Paraguas-Munchique-Bosques Montanos del Sur de Antioquia	0.38	IBA AZE
Finca la Betulia Reserva la Patasola	COL37	1,481	Protected	Noreste de Quindío	0.53	IBA
Finca Paraguay	COL38	12,876	Partially protected	Noreste de Quindío	0.37	IBA
Fusagasuga	COL39	9,198	Not protected	-----	0.31	AZE
Gravilleras del Valle del Río Siecha	COL41	2,274	Not protected	-----	0.26	IBA

Guerrero, Guargua y Laguna Verde†	COL125	57,326	Protected	-----	0.25	
Hacienda La Victoria, Cordillera Oriental	COL42	13,266	Not protected	-----	0.25	AZE
Haciendas Ganaderas del Norte del Cauca	COL43	1,394	Not protected	-----	0.10	IBA
Humedales de la Sabana de Bogotá	COL44	20,682	Not protected	-----	0.28	IBA
La Empalada	COL45	10,560	Partially protected	Paraguas-Munchique-Bosques Montanos del Sur de Antioquia	0.31	AZE
La Forzosa-Santa Gertrudis	COL46	4,106	Partially protected	Sonsón-Nechi	0.34	IBA
La Salina	COL47	8,956	Not protected	Norte de la Cordillera Oriental	0.19	
La Victoria (Caldas)	COL48	767	Partially protected	Sonsón-Nechi	0.34	IBA
La Victoria (Nariño)	COL122	1,111	Not protected	La Victoria-La Cocha-Sibundoy	0.40	AZE
Lago Cumbal	COL49	371	Not protected	-----	0.13	IBA
Laguna de la Cocha	COL50	63,270	Partially protected	La Victoria-La Cocha-Sibundoy	0.34	IBA
Laguna de Tota	COL51	6,263	Not protected	-----	0.25	IBA
Lagunas Bombona y Vancouver	COL52	7,308	Partially protected	Noreste de Quindío	0.35	IBA
Mejue†	COL126	12,805	Protected	Andes Venezolanos	0.37	
Municipio de Pandi	COL55	3.289	Not protected	-----	0.25	AZE
Orquideas - Musinga - Carauta	COL56	94,396	Partially protected	-----	0.32	AZE
Paraíso de Aves del Tabor y Magdalena	COL127	92,356	Partially protected	-----	0.21	IBA
Páramo de Belmira-Santa Inés y bosques asociados†	COL128	50,480	Protected	-----	0.23	
Páramo de Sonsón	COL57	73,041	Partially protected	Sonsón-Nechi	0.32	AZE
Páramo del Almorzadero†	COL129	54,079	Not protected	Norte de la Cordillera Oriental	0.28	
Páramo Tierra Negra†	COL130	6.060	Not protected	-----	0.38	
Páramo Urrao	COL58	35,295	Protected	-----	0.32	AZE
Páramos del Sur de Antioquia	COL59	14,093	Protected	Sonsón-Nechi	0.37	IBA
Páramos y Bosques Altoandinos de Génova	COL60	12,549	Partially protected	Noreste de Quindío	0.36	IBA
Parque Nacional Natural Chingaza y alrededores	COL61	88,443	Protected	Cordillera Oriental-Bogotá	0.30	IBA AZE
Parque Nacional Natural Cordillera de los Picachos	COL26	319,864	Protected	-----	0.19	AZE
Parque Nacional Natural Cueva de los Guácharos	COL62	7,773	Protected	-----	0.39	IBA
Parque Nacional Natural de Pisba	COL63	58,139	Partially protected	Norte de la Cordillera Oriental	0.25	IBA
Parque Nacional Natural El Cocuy	COL64	362,163	Protected	Norte de la Cordillera Oriental	0.17	IBA

Parque Nacional Natural Farallones de Cali	COL65	220,153	Protected	Paraguas-Munchique-Bosques Montanos del Sur de Antioquia	0.35	IBA AZE
Parque Nacional Natural Las Orquídeas	COL66	35,070	Protected	-----	0.34	IBA
Parque Nacional Natural Munchique y extensión sur	COL67	52,490	Protected	Paraguas-Munchique-Bosques Montanos del Sur de Antioquia	0.38	IBA AZE
Parque Nacional Natural Nevado del Huila	COL68	182,382	Protected	Cordillera Central	0.22	IBA
Parque Nacional Natural Paramillo	COL69	607,205	Protected	-----	0.20	IBA
Parque Nacional Natural Puracé	COL70	82,653	Protected	Cordillera Central	0.30	IBA AZE
Parque Nacional Natural Sierra de la Macarena	COL71	687,470	Protected	-----	0.21	IBA
Parque Nacional Natural Sumapaz	COL72	250,646	Protected	Cordillera Oriental-Bogotá	0.20	IBA
Parque Nacional Natural Tamá	COL73	61,128	Protected	Andes venezolanos	0.28	IBA
Parque Nacional Natural Tatamá	COL74	59,414	Partially protected	Paraguas-Munchique-Bosques Montanos del Sur de Antioquia	0.34	IBA
Parque Natural Nacional Sierra Nevada de Santa Marta y sus alrededores	COL110	517,667	Protected	Sierra Nevada de Santa Marta y alrededores	0.30	AZE
Parque Natural Regional Cortadera†	COL131	19,169	Protected	-----	0.20	
Parque Natural Regional Páramo del Duende	COL75	32,136	Partially protected	Paraguas-Munchique-Bosques Montanos del Sur de Antioquia	0.28	IBA
Parque Natural Regional Santurbán-Salazar de las Palmas†	COL132	23,082	Protected	-----	0.26	
Parque Natural Regional Serranía del Perijá†	COL133	29,471	Protected	Cordillera de Perijá	0.44	
Parque Natural Regional y Reserva Forestal Protectora Regional Páramo de Rabanal†	COL134	8,249	Protected	-----	0.25	
Pueblo Bello	COL76	1,269	Protected	Sierra Nevada de Santa Marta y alrededores	0.22	IBA
Refugio Río Claro	COL79	526	Partially protected	-----	0.22	IBA
Región del Alto Calima	COL80	21,917	Partially protected	Paraguas-Munchique-Bosques Montanos del Sur de Antioquia	0.35	IBA
Reserva Biológica Cachalú	COL81	1.195	Protected	Norte de la Cordillera Oriental	0.44	IBA
Reserva El Oso	COL82	4,997	Protected	Cordillera Central	0.30	IBA
Reserva Forestal Protectora Nacional Río Algodonal†	COL135	9,717	Protected	-----	0.30	
Reserva Forestal Yotoco	COL83	508	Protected	Paraguas-Munchique-Bosques Montanos del Sur de Antioquia	0.30	IBA
Reserva Hidrográfica, Forestal y Parque Ecológico de Río Blanco	COL84	4,347	Protected	Noreste de Quindío	0.45	IBA
Reserva Natural Cajibío	COL85	347	Not protected	-----	0.14	IBA

Reserva Natural El Pangán	COL86	7,726	Not protected	Awá-Cotacachi-Illinizas	0.34	IBA
Reserva Natural Ibanasca	COL87	2,393	Protected	Noreste de Quindío	0.50	IBA
Reserva Natural La Planada	COL88	4,519	Protected	Awá-Cotacachi-Illinizas	0.42	IBA AZE
Reserva Natural Laguna de Sonso	COL89	926	Protected	-----	0.14	IBA
Reserva Natural Meremberg	COL90	2,167	Protected	Cordillera Central	0.30	IBA
Reserva Natural Río Ñambí	COL91	8,595	Partially protected	Awá-Cotacachi-Illinizas	0.37	IBA
Reserva Natural Semillas de Agua	COL92	1,270	Protected	Noreste de Quindío	0.41	IBA
Reserva Natural Tambito	COL93	124	Not protected	Paraguas-Munchique-Bosques Montanos del Sur de Antioquia	0.33	IBA
Reserva Regional Bajo Cauca Nechí	COL94	142,495	Not protected	Sonsón-Nechi	0.19	IBA
Reservas Comunitarias de Roncesvalles	COL95	41,373	Partially protected	Noreste de Quindío	0.33	IBA
Rocas de Suesca†	COL136	885	Not protected	-----	0.28	
San Sebastián	COL97	6,674	Protected	Sonsón-Nechi	0.38	IBA
Santuario de Fauna y Flora Galeras	COL99	9,020	Protected	-----	0.22	IBA AZE
Santurbán-Sisavita-Mutiscua	COL138	39,737	Protected	-----	0.35	
Selva de Florencia	COL101	29,506	Partially protected	Sonsón-Nechi	0.43	IBA AZE
Serranía de las Minas	COL103	109,935	Protected	Cordillera Central	0.28	IBA
Serranía de las Quinchas	COL104	100,785	Partially protected	-----	0.15	IBA
Serranía de los Churumbelos	COL105	105,496	Protected	-----	0.29	IBA
Serranía de los Paraguas	COL106	259,592	Partially protected	Paraguas-Munchique-Bosques Montanos del Sur de Antioquia	0.29	IBA
Serranía de los Yariguíes	COL102	288,265	Protected	Norte de la Cordillera Oriental	0.22	IBA AZE
Serranía de San Lucas	COL108	816,648	Not protected	-----	0.18	IBA
Serranía del Pinche	COL109	4,870	Partially protected	Paraguas-Munchique-Bosques Montanos del Sur de Antioquia	0.27	IBA AZE
Soatá	COL111	1,173	Not protected	Norte de la Cordillera Oriental	0.25	IBA
Unidad Biogeografica de Siscunci Oceta†	COL137	57,912	Protected	Norte de la Cordillera Oriental	0.25	
Valle de San Salvador	COL113	76,833	Protected	Sierra Nevada de Santa Marta y alrededores	0.30	IBA
Valle de Sibundoy y Laguna de la Cocha	COL115	165,094	Partially protected	La Victoria-La Cocha-Sibundoy	0.32	
Valle del Río Frío	COL116	47,995	Partially protected	Sierra Nevada de Santa Marta y alrededores	0.32	IBA
Vereda el Llano	COL117	3,306	Not protected	Noreste de Quindío	0.36	
Vereda Las Minas y alrededores	COL119	165,046	Protected	Norte de la Cordillera Oriental	0.31	IBA AZE

Villavicencio	COL120	3,770	Not protected	Cordillera Oriental-Bogotá	0.19	AZE

* Protected: > 80 percent overlap with a protected area.
Partially protected: 10-80 percent overlap.
Not protected: < 10 percent overlap. See Section 5.4 on legal protection of KBAs for more information on designations.
† Nominated KBA.
‡ KBA nominated between August and December 2020. Not included in the profile analyses.

Ecuador

Despite its relatively small size, Ecuador has 88 KBAs that together cover 36 percent of the Ecuadorian area of the hotspot (Figure 5.3, Table 5.2). The KBAs have an average area of 53,508 hectares but range from 63 hectares to 523,632 hectares (Table 5.5). The number of Ecuadorian KBAs has increased since the previous ecosystem profile was published. Seventy-nine KBAs had been previously identified in Ecuador, 11 of them have been removed and 20 new sites added (Appendix 5.3). The KBAs with the highest RBVs for the country are concentrated north of the Andes Cordillera in Ecuador. The KBAs with the next highest RBVs are found along the eastern foothills of the Cordillera to the south.

Three of the sites with the highest RBVs (0.64-0.58) for Ecuador and for the Tropical Andes Hotspot are Mindo and western foothills of Pichincha volcano (ECU44), Rio Toachi-Chiriboga (ECU66) and Maquipucuna-Rio Guayllabamba (ECU43). They are located in the binational Awá-Cotacachi-Illinizas Corridor, in the western Andes cordillera west of Quito, an area renowned for its rich avifauna. Mashpi-Pachijal (ECU89) and Los Bancos-Milpe (ECU41) are very high RBV sites (0.52 and 0.48, respectively) that also form part of this grouping, to the west of which, and towards the Ecuadorian Chocó, is the Caoní River (ECU54). The area is a mosaic of agricultural lands, natural ecosystems (some of which are under national or subnational protection) and several private reserves with ecotourism operations. Some sectors of these KBAs have suffered relatively heavy disturbance. Despite 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 continue. The area is also subject to land speculation due to rising property values. Immediately south of this group of KBAs is the Reserva Ecológica Los Illinizas y sus alrededores (ECU42), which includes the western foothills of the snow-capped Illinizas, Quilotoa and El Corazón volcanoes. The reserve provides resources to medium-sized cities such as Machachi, Latacunga and Saquisilí, which are located nearby in the inter-Andean valley.

Further north in the Awá-Cotacachi-Illinizas Corridor, in the western Andes and adjacent to the Ecuadorian zone of the Tumbes-Chocó-Magdalena Hotspot, there is a group of five high RBV KBAs (0.49-0.40). The largest is the Reserva Ecológica Cotacachi-Cayapas (ECU61). It is surrounded by KBAs linked to private protected areas, namely Bosque Protector Los Cedros (ECU14) and Intag-Toisán (ECU34), and is connected, via the Awacachi Corridor (ECU28), to indigenous communities in and around the Territorio Étnico Awá y alrededores (ECU70), which extends to Colombia. The area in Ecuador features páramos and montane forests along an elevation gradient. Human use of natural resources in the area is mainly selective logging, cattle grazing and subsistence agriculture. There are mining concessions planned for the Intag-Toisán area, but local communities have opposed them. Private protected forests and communal reserves have been designated. Conservation and livelihood projects have succeeded, with CEPF support, in having Intag-Toisán (ECU34) declared a Conservation and Sustainable Use Area (ACUS by its acronym in Spanish) in recognition of its water, biological, cultural and productive importance.

In the Northeastern Corridor in Ecuador, there is another group of KBAs with high RBVs (0.51-0.32). Three of these KBAs correspond with national protected areas, Reserva Ecológica Antisana and surroundings (ECU7), Parque Nacional Cayambe-Coca (ECU59) and Parque Nacional Sumaco-Napo Galeras (ECU52); the fourth, Cordillera de Huacamayos-San Isidro-Sierra Azul (ECU25), includes private reserves. The protected areas cover a diverse scale of habitats, from high páramos dotted with lakes to sub-Andean forests that then give way to the jungles of the Amazon basin. The Parque Nacional Cayambe-Coca, Reserva Ecológica Antisana and the Parque Nacional Sumaco Napo Galeras protect one of the main sources of water for the country and for the city of Quito and surrounding towns. They encompass 80 percent of the watershed that supplies the country's largest hydroelectric plant, Coca Codo Sinclair (Ministry of Environment 2015). Together, these KBAs and those northwest of Quito supply water for a population of at least three million inhabitants in the capital and its surroundings.

In the central Ecuadorian Andes,in the Sangay Podocarpus Corridor, east of the cities of Cuenca and Gualaceo, four KBAs with medium-high RBVs (0.30-0.25) are grouped together: Alrededores de Amaluza (ECU6), Montañas de Zapote-Najda (ECU47), Gualaceo-Limón Indanza (ECU86) and Bosque Protector Moya-Molón (ECU16). They bring together different habitats such as sub-Andean forests of the Amazonian slope, páramos, stunted forests as well as Andean and cloud forests that become drier towards the inter-Andean valley. The forests of these KBAs capture water for consumption in Cuenca and Gualaceo, located in the inter-Andean valley. They form part of the Paute River basin, which is also an important hydrological resource for agriculture and energy generation in the country.

South of the Andes Cordillera in Ecuador, in the provinces of Loja and Zamora Chinchipe, are the Tumbesian Endemism Region, the Southern Central Andes Endemism Region and the Central Andes Páramo Region (Flanagan *et al.* 2005). These regions have dry forests and, at higher elevations, cloud forests and páramos known for their high levels of bird endemism and distinctive vegetation types that result from a different geological history than the rest of the Ecuadorian Andes. In this region, the Sangay Podocarpus Corridor includes the medium-high RBV KBAs: Saraguro Las Antenas (ECU95) and Acanamá-Guashapamba-Aguirre (ECU3). It also includes, further southeast of the corridor, the Parque Nacional Podocarpus (ECU50) and around it, the medium-high RBV KBAs (0.38-0.26) 1 km al Sur de Loja (ECU1), Reserva Tapichalaca (ECU 64) and Abra de Zamora (ECU2). The latter is itself a hotspot of amphibian endemism, and it is where Phase II CEPF-funded research reported 29 amphibian species, of which 11 are endemic, and 11 are new to science (Székely *et al.* 2020; Ordóñez-Delgado *et al.* 2020). The characteristic vegetation of the area includes a wide variety of orchids, the century-old conifers *Podocarpus* and the cascarilla (*Cinchona officinalis*), known for the medicinal properties of its bark from which quinine is extracted. The area is also important for the provision of water to more than 200,000 people in the provinces of Loja and Zamora-Chinchipe.

Figure 5.3. KBAs in the Ecuadorian Region of the Tropical Andes Hotspot

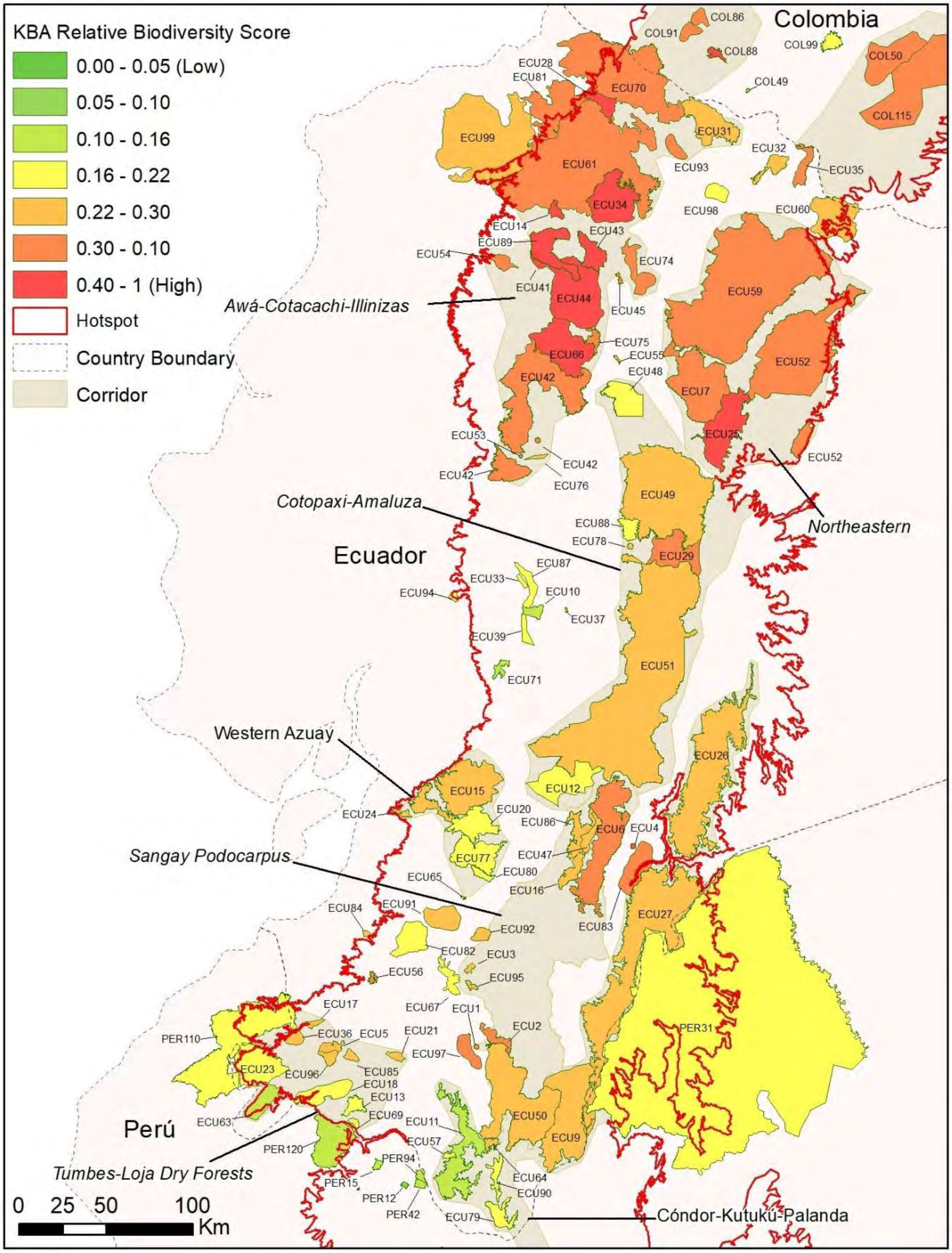


Table 5.5. KBAs in Ecuador

KBA name	CEPF code	Area (ha)	Protection*	Corridor	RBV	Other
1 km oeste de Loja	ECU1	672	Protected	Sangay Podocarpus	0.33	AZE
Abra de Zamora†	ECU2	7,833	Protected	Sangay Podocarpus	0.38	
Acanamá-Guashapamba-Aguirre	ECU3	1,994	Partially protected	Sangay Podocarpus	0.26	IBA
Agua Rica	ECU4	806	Not protected	-----	0.445	AZE
Alamor-Celica	ECU5	6,529	Protected	Bosques Secos de Tumbes-Loja	0.256	IBA
Alrededores de Amaluza	ECU6	109,051	Partially protected	Sangay Podocarpus	0.30	
Bosque Protector Alto Nangaritza	ECU9	113,295	Protected	Cóndor-Kutukú-Palanda	0.261	IBA
Bosque Protector Cashca Totoras	ECU10	6,623	Not protected	-----	0.156	IBA AZE
Bosque Protector Colambo-Yacuri	ECU11	63,755	Protected	Cóndor-Kutukú-Palanda	0.159	IBA
Bosque Protector Dudas-Mazar	ECU12	54,357	Partially protected	Cotopaxi-Amaluza	0.211	IBA
Bosque Protector Jatumpamba-Jorupe	ECU13	8,111	Protected	Bosques Secos de Tumbes-Loja	0.207	IBA
Bosque Protector Los Cedros	ECU14	5,619	Not protected	Awá-Cotacachi-Illinizas	0.457	IBA
Bosque Protector Molleturo Mullopungo	ECU15	99,963	Protected	Oeste de Azuay	0.228	IBA
Bosque Protector Moya-Molón	ECU16	12,376	Not protected	Sangay Podocarpus	0.25	IBA
Bosque Protector Puyango	ECU17	2,713	Protected	Bosques Secos de Tumbes-Loja	0.24	IBA
Bosque y Vegetación Protector El Chorro†	ECU80	4,913	Protected	Oeste de Azuay	0.211	
Cajas-Mazán	ECU20	31,681	Protected	Oeste de Azuay	0.193	IBA
Cañón del río Catamayo	ECU18	27,634	Protected	Bosques Secos de Tumbes-Loja	0.192	IBA
Catacocha	ECU21	3,737	Protected	Bosques Secos de Tumbes-Loja	0.229	IBA
Cayapas-Santiago-Wimbí	ECU81	66,584	Partially protected	Awá-Cotacachi-Illinizas	0.37	IBA
Cazaderos-Mangaurquillo	ECU23	51,005	Protected	Bosques Secos de Tumbes-Loja	0.165	IBA
Cerro de Hayas-Naranjal	ECU24	2,655	Protected	Oeste de Azuay	0.257	IBA
Chilla†	ECU82	28,591	Partially protected	-----	0.221	
Conchay†	ECU83	32,055	Not protected	Cóndor-Kutukú-Palanda	0.331	
Cordillera de Huacamayos-San Isidro-Sierra Azul	ECU25	69,671	Protected	Corredor Nororiental	0.51	IBA
Cordillera de Kutukú	ECU26	191,035	Not protected	Cóndor-Kutukú-Palanda	0.273	IBA AZE
Cordillera del Cóndor	ECU27	257,017	Partially protected	Cóndor-Kutukú-Palanda	0.251	IBA

Corredor Awacachi	ECU28	16,668	Partially protected	Awá-Cotacachi-Illinizas	0.487	IBA
Corredor Ecológico Llanganates-Sangay	ECU29	46,364	Not protected	Cotopaxi-Amaluza	0.35	IBA
Daucay	ECU84	1,345	Not protected	-----	0.228	IBA
El Ángel-Cerro Golondrinas y alrededores	ECU31	49,227	Protected	Awá-Cotacachi-Illinizas	0.25	IBA AZE
El Sauce†	ECU85	3,679	Protected	Bosques Secos de Tumbes-Loja	0.235	
Estación Biológica Guandera-Cerro Mongus	ECU32	13,094	Protected	-----	0.255	IBA
Gualaceo-Limón Indanza†	ECU86	20,315	Partially protected	Sangay Podocarpus	0.27	
Guanujo†	ECU87	11,558	Not protected	-----	0.186	
Guaranda, Gallo Rumi	ECU33	1,866	Not protected	-----	0.196	AZE
Intag-Toisán	ECU34	63,884	Not protected	Awá-Cotacachi-Illinizas	0.417	IBA
La Bonita-Santa Bárbara	ECU35	13,060	Protected	-----	0.317	IBA AZE
La Tagua	ECU36	6,624	Protected	Bosques Secos de Tumbes-Loja	0.232	IBA
Lago de Colta	ECU37	288	Not protected	-----	0.108	IBA
Las Guardias	ECU39	6,065	Not protected	-----	0.191	
Los Bancos-Milpe	ECU41	3,316	Protected	Awá-Cotacachi-Illinizas	0.478	IBA
Manteles-El Triunfo-Sucre	ECU88	10,735	Not protected	Cotopaxi-Amaluza	0.205	IBA
Maquipucuna-Río Guayllabamba	ECU43	21,069	Protected	Awá-Cotacachi-Illinizas	0.577	IBA
Mashpi-Pachijal	ECU89	39,525	Protected	Awá-Cotacachi-Illinizas	0.524	IBA
Mindo y Estribaciones Occidentales del volcán Pichincha	ECU44	94,710	Protected	Awá-Cotacachi-Illinizas	0.645	IBA AZE
Mitad del Mundo†	ECU45	1,289	Protected	Awá-Cotacachi-Illinizas	0.348	
Montañas de Zapote-Najda	ECU47	9,699	Partially protected	Sangay Podocarpus	0.28	IBA
Oeste del Páramo de Apagua	ECU76	1,859	Not protected	Awá-Cotacachi-Illinizas	0.229	AZE
Palanda	ECU90	9,456	Protected	Cóndor-Kutukú-Palanda	0.199	IBA
Parque Nacional Cayambe-Coca	ECU59	433,412	Protected	Corredor Nororiental	0.32	IBA AZE
Parque Nacional Cotopaxi	ECU48	34,437	Protected	Cotopaxi-Amaluza	0.169	IBA
Parque Nacional Llanganates	ECU49	230,225	Protected	Cotopaxi-Amaluza	0.277	IBA
Parque Nacional Podocarpus	ECU50	142,945	Protected	Sangay Podocarpus	0.3	IBA AZE
Parque Nacional Sangay	ECU51	523,632	Protected	Cotopaxi-Amaluza	0.25	IBA
Parque Nacional Sumaco-Napo Galeras	ECU52	217,629	Protected	Corredor Nororiental	0.40	IBA AZE
Pilaló	ECU53	335	Not protected	Awá-Cotacachi-Illinizas	0.354	AZE

Refugio de Vida Silvestre Pasochoa	ECU55	701	Partially protected	-----	0.254	IBA
Reserva Buenaventura	ECU56	2,209	Not protected	-----	0.329	IBA
Reserva Comunal Bosque de Angashcola	ECU57	1,944	Protected	Cóndor-Kutukú-Palanda	0.191	IBA
Reserva Ecológica Antisana (oeste) y alrededores	ECU7	113,908	Protected	Corredor Nororiental	0.33	IBA AZE
Reserva Ecológica Cofán-Bermejo	ECU60	56,091	Protected	-----	0.26	IBA
Reserva Ecológica Cotacachi-Cayapas	ECU61	361,614	Partially protected	Awá-Cotacachi-Illinizas	0.401	IBA
Reserva Ecológica Los Illinizas y alrededores	ECU42	169,316	Protected	Awá-Cotacachi-Illinizas	0.318	IBA AZE
Reserva Natural Tumbesia-La Ceiba-Zapotillo	ECU63	19,377	Protected	Bosques Secos de Tumbes-Loja	0.113	IBA
Reserva Tapichalaca	ECU64	3,925	Protected	Cóndor-Kutukú-Palanda	0.262	IBA
Reserva Yunguilla	ECU65	182	Protected	Oeste de Azuay	0.229	IBA AZE
Río Caoní	ECU54	9,101	Not protected	Awá-Cotacachi-Illinizas	0.346	IBA
Río Jubones†	ECU91	23,614	Partially Protected	-----	0.244	
Río León†	ECU92	6,564	Not protected	Sangay Podocarpus	0.30	
Río Toachi-Chiriboga	ECU66	71,187	Not protected	Awá-Cotacachi-Illinizas	0.579	IBA AZE
Salinas de Ibarra†	ECU93	10,064	Not protected	Awá-Cotacachi-Illinizas	0.363	
Samama Mumbes†	ECU94	2,251	Protected	-----	0.197	
Saraguro Las Antenas†	ECU95	1,876	Protected	Sangay Podocarpus	0.30	
Selva Alegre	ECU67	11,474	Protected	Sangay Podocarpus	0.20	IBA
Sur de Alamor†	ECU96	5,799	Protected	Bosques Secos de Tumbes-Loja	0.269	
Tambo Negro	ECU69	1,945	Protected	Bosques Secos de Tumbes-Loja	0.179	IBA
Territorio Étnico Awá y alrededores	ECU70	204,930	Not protected	Awá-Cotacachi-Illinizas	0.38	IBA
Tiquibuzo	ECU71	4,965	Not protected	-----	0.156	IBA
Uritusinga Cerro Ventanas y Villonaco†	ECU97	14,532	Partially protected	-----	0.31	
Utuana-Bosque de Hanne	ECU73	63	Not protected	Bosques Secos de Tumbes-Loja	0.149	IBA
Valle de Guayllabamba	ECU74	24,363	Partially protected	Awá-Cotacachi-Illinizas	0.315	IBA
Valle del Chota†	ECU98	11,104	Not protected	-----	0.22	
Verde-Ónzole-Cayapas-Canandé	ECU99	222,977	Not protected	Awá-Cotacachi-Illinizas	0.282	IBA
Volcán Atacazo	ECU75	9,316	Partially protected	Awá-Cotacachi-Illinizas	0.374	IBA
Yanuncay-Yanasacha	ECU77	39,679	Protected	Oeste de Azuay	0.164	IBA
Yungilla	ECU78	995	Not protected	Cotopaxi-Amaluza	0.248	AZE

Zumba-Chito	ECU79	13,967	Protected	Cóndor-Kutukú-Palanda	0.189	IBA

Peru

Of the seven hotspot countries, Peru ranks second in the number of KBAs, with 106 sites covering an area of 9,344,586 hectares or one-fifth of the Peruvian extent of the hotspot (Table 5.2). The Peruvian KBAs have an average area of 135,790 hectares but range from 120 hectares to 2,184,234 hectares (Table 5.6). Peru also held the second-place spot in the previous ecosystem profile with 96 KBAs identified in 2015, 16 of those KBAs have been removed, and 26 added (Appendix 5.3). Peru's KBAs, and those with the highest RBVs for the country, are concentrated on the eastern flank of the Andes, with a few located on the dry western flank or in the inter-Andean valleys (Figure 5.4a and 5.4b).

Five of the country's highest RBV KBAs (0.18-0.24) are clustered in the Northeast Corridor of Peru (Figure 5.4a): Río Utcubamba (PER84), Abra Pardo de Miguel (PER6), Cordillera de Colán (PER28), Abra Patricia-Alto Mayo (PER7), and Moyobamba (PER65). Three bird species: Lulu's tody-flycatcher (*Poecilotriccus luluae*, EN), the ochre-fronted antpitta (*Grallaricula ochraceifrons*, EN) and the long-whiskered owlet (*Xenoglaux loweryi*, EN), and five threatened amphibian species are endemic to this area, including two amphibian species with a very small and fragmented distribution: Colan mountains robber frog (*Pristimantis serendipitus*, EN) and *Rhinella arborescandens* (EN). In total, the distributions of 61 threatened species overlap with these sites, which include both public and private protected areas. The area is threatened by planned roads and land tenure issues but has benefited from sustainable conservation investments and sustainable productive activities in recent years, including Phase II CEPF investments. The hydrological resources of the Colán Cordillera ensure the supply of drinking water for people living downstream along the Utcubamba and Chiriaco rivers.
In central Peru, the Carpish-Yanachaga Corridor (Figure 5.4a) has four KBAs with medium RBVs (0.18-0.16), Parque Nacional Tingo Maria (PER71), Milpo (PER63), Laguna Gwengway (PER53), and Carpish (PER18). Carpish is an area of stunted forests, cloud pre-montane forests and dry forests of the inter-Andean valley. It is highly threatened due to invasive agriculture and cattle ranching, but, with the support of CEPF, was recently established as the first regional conservation area for the Department of Huánuco by the Ministry of Environment. This KBA alone overlaps with the distribution of 43 threatened species including, *Nymphargus mixomaculatus*, a Critically Endangered amphibian endemic to the province of Huánuco, 11 Endangered amphibians, three Endangered birds, most notably the golden-backed mountain tanager (*Cnemathraupis aureodorsalis*) and one Endangered mammal, the Peruvian spider monkey (*Ateles chamek*).

The remaining Peruvian KBAs with medium RBVs are mostly in the southeast, in the Cordillera de Vilcanota Corridor (Figure 5.4b). Kosñipata-Carabaya (PER44) extends between the Parque Nacional Manu (PER60) and the KBA Quincemil (PER75) and Río Araza (PER97). These KBAs, together with Abra Málaga-Vilcanota (PER5), 6 km al sur de Ocobamba (PER3) and Lagos Yanacocha (PER50), coincide with private conservation areas established and managed by the indigenous Q'Ero community and adjoin the famous Santuario Histórico de Machu Picchu (PER90). They include small *Polylepis-Gynoxis* forests and montane forests with extensive areas of bamboo and puna grassland that coincide with the distribution of 27 Critically Endangered and Endangered species.

Figure 5.4a. KBAs in the Northern Peruvian Region of the Tropical Andes Hotspot

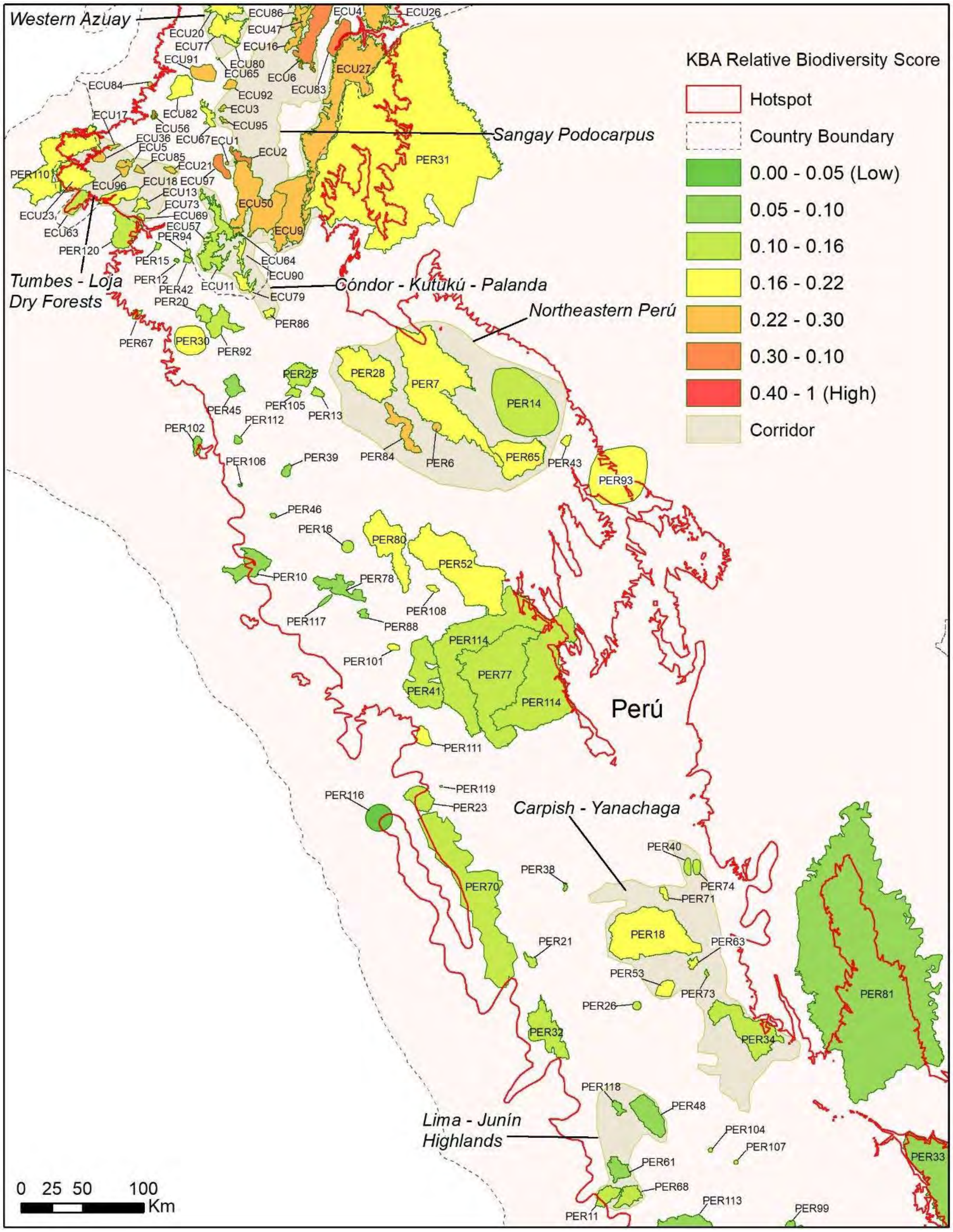


Figure 5.4b. KBAs in the Southern Peruvian Region of the Tropical Andes Hotspot

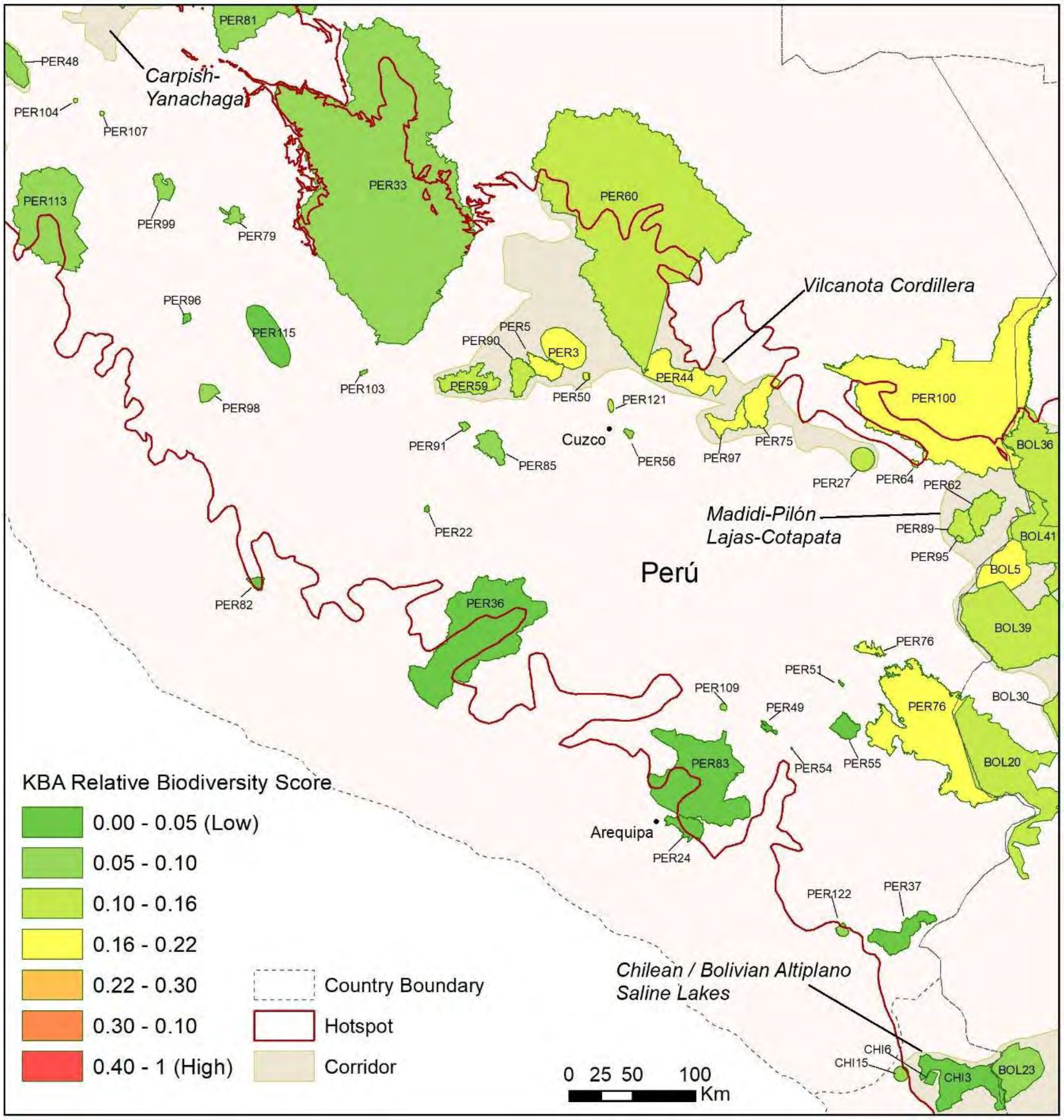


Table 5.6. KBAs in Peru

KBA name	CEPF code	Area (ha)	Protection*	Corridor	RBV	Other
6 km sur de Ocobamba	PER3	76,568	Not protected	Cordillera de Vilcanota	0.194	AZE
Abra Málaga-Vilcanota	PER5	31,083	Partially protected	Cordillera de Vilcanota	0.192	IBA
Abra Pardo de Miguel	PER6	4,194	Partially protected	Noreste de Perú	0.24	
Abra Patricia-Alto Mayo	PER7	353,410	Partially protected	Noreste de Perú	0.19	IBA
Alto Valle del Saña	PER10	48,027	Partially protected	-----	0.065	IBA
Alto Valle Santa Eulalia-Milloc	PER11	19,698	Not protected	Tierras altas de Lima-Junín	0.123	IBA
Apacheta-Pilpichaca†	PER98	14,875	Not protected	-----	0.081	
Área de Conservación Regional Huaytapallana†	PER99	21,064	Protected	-----	0.104	
Área del Río Mantaro	PER115	84,323	Not protected	-----	0.029	AZE
Aypate	PER12	973	Partially protected	-----	0.078	IBA
Bagua	PER13	5,160	Not protected	-----	0.119	IBA
Bahuaja-Sonene	PER100	1,016,488	Protected	Madidi-Pilón Lajas-Cotapata	0.175	IBA
Bosque de Cuyas	PER15	2,164	Not protected	-----	0.134	IBA
Cajabamba†	PER101	4,058	Not protected	-----	0.169	
Calendín	PER16	7,628	Not protected	-----	0.123	
Carpish	PER18	211,339	Partially protected	Carpish-Yanachaga	0.16	IBA AZE
Cerro Chinguela	PER20	13,522	Partially protected	-----	0.113	IBA
Cerro Huanzalá-Huallanca	PER21	6,324	Protected	-----	0.128	IBA
Chalhuanca	PER22	1,428	Not protected	-----	0.046	IBA
Champará	PER23	31,195	Partially protected	-----	0.115	IBA
Chiguata	PER24	30,501	Not protected	-----	0.053	IBA
Chiñama	PER102	7,966	Not protected	-----	0.086	IBA
Chinchipe	PER25	34,555	Not protected	-----	0.139	IBA AZE
Chungui-Rumichaca†	PER103	1,476	Not protected	-----	0.086	
Conchamarca, Ambo	PER26	3,660	Not protected	-----	0.12	AZE
Cordillera Carabaya	PER27	24,612	Not protected	Cordillera de Vilcanota	0.135	AZE
Cordillera de Colán	PER28	134,874	Partially protected	Noreste de Perú	0.20	IBA
Cordillera de Huancabamba	PER30	50,734	Not protected	-----	0.191	AZE

KBA name	CEPF code	Area (ha)	Protection*	Corridor	RBV	Other
Cordillera del Cóndor	PER31	1,664,005	Partially protected	Cóndor-Kutukú-Palanda	0.251	IBA
Cordillera Huayhuash y Nor-Oyón	PER32	74,497	Partially protected	-----	0.119	IBA
Cordillera Vilcabamba	PER33	2,184,233	Partially protected	-----	0.089	IBA
Cordillera Yanachaga	PER34	105,016	Protected	Carpish-Yanachaga	0.15	IBA AZE
Cotahuasi	PER36	451,538	Protected	-----	0.025	IBA
Covire	PER37	61,344	Partially protected	-----	0.043	IBA
Cullcui	PER38	1,619	Not protected	-----	0.081	IBA
Daniel Alomía Robles	PER40	6,324	Not protected	Carpish-Yanachaga	0.14	AZE
El Molino	PER41	116,437	Not protected	-----	0.158	IBA
Entre Puerto Balsa y Moyobamba	PER14	224,396	Not protected	Noreste de Perú	0.14	AZE
Huamba	PER42	2,550	Partially protected	-----	0.14	IBA AZE
Huasahuasi	PER104	912	Not protected	-----	0.123	AZE
Jaén-Bellavista†	PER105	6,404	Not protected	-----	0.159	
Jesús del Monte	PER43	4,966	Protected	-----	0.178	IBA
Kosñipata-Carabaya	PER44	96,492	Partially protected	Cordillera de Vilcanota	0.177	
La Cocha	PER45	18,185	Not protected	-----	0.07	IBA
La Esperanza	PER46	1,558	Not protected	-----	0.09	IBA
La Granja†	PER106	534	Not protected	-----	0.093	
Lago de Junín	PER48	49,713	Protected	Tierras altas de Lima-Junín	0.092	IBA AZE
Lago Lagunillas	PER49	4,514	Not protected	-----	0.048	IBA
Lagos Yanacocha	PER50	2,439	Partially protected	Cordillera de Vilcanota	0.165	IBA
Laguna de Chacas	PER51	848	Not protected	-----	0.042	IBA
Laguna de los Cóndores	PER52	261,647	Protected	-----	0.168	IBA
Laguna Gwengway	PER53	14,678	Not protected	Carpish-Yanachaga	0.17	AZE
Laguna Maquera	PER54	120	Not protected	-----	0.031	IBA
Laguna Umayo	PER55	25,340	Not protected	-----	0.051	IBA
Lagunas de Huacarpay	PER56	3,373	Not protected	-----	0.092	IBA
Mandorcasa	PER59	62,444	Partially protected	Cordillera de Vilcanota	0.117	IBA
Manu	PER60	1,593,485	Protected	Cordillera de Vilcanota	0.146	IBA AZE
Maraynioc puna	PER107	925	Not protected	-----	0.162	AZE

KBA name	CEPF code	Area (ha)	Protection*	Corridor	RBV	Other
Marcapomacocha	PER61	20,636	Not protected	Tierras altas de Lima-Junín	0.101	IBA
Maruncunca	PER62	49,712	Not protected	Madidi-Pilón Lajas-Cotapata	0.143	IBA
Milpo	PER63	4,849	Not protected	Carpish-Yanachaga	0.17	IBA
Mina Inca	PER64	2,265	Not protected	-----	0.181	IBA
Moyobamba	PER65	91,527	Not protected	Noreste de Perú	0.18	IBA
Nevado Bolívar†	PER108	3,897	Protected	-----	0.213	
Occopalca†	PER109	2,041	Not protected	-----	0.058	
Paltashaco	PER67	3,350	Not protected	-----	0.119	IBA
Pampas Pucacocha y Curicocha	PER68	21,581	Not protected	Tierras altas de Lima-Junín	0.131	IBA
Parque Nacional Cerros de Amotape	PER110	153,428	Protected	Bosques Secos de Tumbes-Loja	0.214	IBA
Parque Nacional Cutervo y sus alrededores	PER39	5,713	Partially protected	-----	0.062	AZE
Parque Nacional Huascarán	PER70	325,360	Protected	-----	0.14	IBA
Parque Nacional Tingo María	PER71	4,579	Protected	Carpish-Yanachaga	0.18	IBA
Pelagatos†	PER111	14,520	Not protected	-----	0.201	
Playa Pampa	PER73	1,175	Not protected	Carpish-Yanachaga	0.15	IBA
Previsto	PER74	6,474	Not protected	Carpish-Yanachaga	0.15	AZE
Pucara†	PER112	3,413	Not protected	-----	0.073	
Quincemil	PER75	58,324	Partially protected	Cordillera de Vilcanota	0.191	IBA
Ramis y Arapa (Lago Titicaca, sector Peruano)	PER76	438,804	Not protected	-----	0.166	IBA AZE
Reserva Comunal El Sira	PER81	1,634,693	Partially protected	-----	0.093	IBA AZE
Reserva Nacional Pampa Galeras	PER82	7,395	Protected	-----	0.051	IBA
Reserva Nacional Salinas y Aguada Blanca	PER83	337,737	Protected	-----	0.032	IBA
Reserva Paisajística Nor Yauyos Cochas y zona de amortiguamiento†	PER113	310,377	Partially protected	-----	0.081	
Río Abiseo y Tayabamba	PER77	309,651	Protected	-----	0.13	IBA
Río Araza†	PER97	33,956	Not protected	Cordillera de Vilcanota	0.184	
Río Cajamarca	PER78	37,871	Not protected	-----	0.072	IBA
Río Mantaro-Cordillera Central	PER79	13,427	Not protected	-----	0.093	IBA
Río Marañón	PER80	106,115	Partially protected	-----	0.195	IBA AZE
Río Utcubamba	PER84	35,534	Not protected	Noreste de Perú	0.24	IBA

KBA name	CEPF code	Area (ha)	Protection*	Corridor	RBV	Other
Runtacocha-Morococha	PER85	33,477	Not protected	-----	0.079	IBA
San José de Lourdes	PER86	5,005	Not protected	Cóndor-Kutukú-Palanda	0.19	IBA
San Juan Cajamarca	PER117	3,676	Not protected	-----	0.099	AZE
San Marcos	PER88	4,477	Not protected	-----	0.059	IBA
Sandia	PER89	33,077	Not protected	Madidi-Pilón Lajas-Cotapata	0.125	IBA
Santuario Histórico Machu Picchu	PER90	34,689	Protected	Cordillera de Vilcanota	0.143	IBA
Santuario Nacional de Huayllay†	PER118	6,447	Protected	Tierras altas de Lima-Junín	0.062	
Santuario Nacional del Ampay	PER91	3,577	Protected	-----	0.091	IBA
Santuario Nacional Tabaconas-Namballe	PER92	33,674	Protected	-----	0.12	IBA
Sihuas†	PER119	294	Not protected	-----	0.117	
Suyo-La Tina	PER120	48,896	Not protected	Bosques Secos de Tumbes-Loja	0.145	IBA
Tarapoto	PER93	184,513	Partially protected	-----	0.181	AZE
Toldo	PER94	2,864	Partially protected	-----	0.151	IBA
Valcón	PER95	1,881	Not protected	Madidi-Pilón Lajas-Cotapata	0.124	IBA
Valle del Río Santa (Provincia de Santa)	PER116	35,889	Not protected	-----	0.052	AZE
Valle Urubamba área cerca de Taray	PER121	3,263	Not protected	-----	0.118	AZE
Volcán Yucamani	PER122	6,185	Partially protected	-----	0.056	IBA
Yauli	PER96	3,665	Not protected	-----	0.048	IBA
Zona de amortiguamiento del Parque Nacional Río Abiseo	PER114	627,281	Protected	-----	0.126	AZE

* Protected: > 80 percent overlap with a protected area.
Partially protected: 10-80 percent overlap.
Not protected: < 10 percent overlap. See the section 5.4 on the protection of KBAs for more information on designations.
† Nominated KBA.

Bolivia

Bolivia has 47 KBAs, covering an area of 6,664,450 hectares or about one-fifth of the Bolivian hotspot area (Figure 5.5, Table 5.2). On average, the Bolivian KBAs have an area of 144,196 hectares, ranging from 697 hectares to 611,736 hectares (Table 5.7). Since the previous ecosystem profiling process, 11 KBAs have been removed and 15 added, giving Bolivia four more KBAs than in 2015 (Appendix 5.3). As in Peru, Bolivia's highest RBV KBAs are on the eastern slope of the Andes. Bolivia has very few KBAs with medium and high RBVs, possibly because it is less biodiverse and has fewer globally threatened species (170) in the hotspot than Peru (394), Ecuador (429) and Colombia (633). Another possible explanation is that less research has been carried out in Bolivia due to scarce resources and the presence of a smaller research community. However, these KBAs support various ecosystems such as highland montane *Polylepis* forests, montane yungas forests with interspersed dry forests at lower elevations and, at higher elevations, a unique mixed vegetation of grasslands and shrublands that is locally called "yungas páramos".

In the Madidi-Pilón Lajas-Cotapata Corridor is the Bosque de Polylepis de Madidi (BOL5), the northernmost KBA with a medium RBV (0.21). Thirty-four threatened species are found here, including the amphibian *Telmatobius timens* (CR) and the royal cinclodes (*Cinclodes aricomae*, CR). This KBA is an IBA that overlaps with the highland montane *Polylepis* forests of Parque Nacional Madidi, and the Yungas Superiores de Apolobamba (BOL39). However, the Madidi and Apolobamba national parks, highly prized for their exceptionally high species richness, do not score high RBVs due to the relatively wide distribution of threatened species found there. A nearby group of KBAs in the same corridor, and with the highest RBVs for the country, is located in the Yungas near the city of La Paz. The Parque Nacional and Área Natural de Manejo Integrado Cotapata (BOL45) and Bosque de Polylepis de Taquesi (BOL8) are two of the three KBAs with the highest RBVs for Bolivia (0.35 and 0.29, respectively),however, the latter is not in a protected area. Surrounding them are two protected KBAs of medium RBV (0.16 and 0.23): Cotapata (BOL13) and Parque Nacional Tuni Condoriri (BOL46). These KBAs are home to the royal cinclodes (*Cinclodes aricomae*, CR) and the plant *Freziera apolobambensis* (CR) and encompass the entire range of five Critically Endangered amphibians with very restricted distribution, such as the devil's eyes frog (*Oreobates zongoensis*).

The third KBA with the highest RBV (0.24) for Bolivia, Candelaria-Corani (BOL44), is at the northwestern end of another medium RBV cluster in the Isiboro-Amboró Corridor, which includes Cristal Mayu y alrededores (BOL14), Yungas Inferiores de Carrasco (BOL34) and Yungas Superiores de Carrasco (BOL40). The latter two KBAs are sites that, despite their legal protection, are undergoing large-scale intervention and transformation due to illicit crops and the construction of a hydroelectric dam (see Chapter 6 for more details). These KBAs and other sites around them are areas that provide habitat for threatened species endemic to Bolivia such as the horned curassow (*Pauxi unicornis*, CR) and the Cochabamba mountain finch (*Poospiza garleppi*, EN), as well as the plants *Gynoxys neovelutina* (EN) and *Puya ibischii* (EN).

Figure 5.5. KBAs in the Bolivian and Chilean Region of the Tropical Andes Hotspot

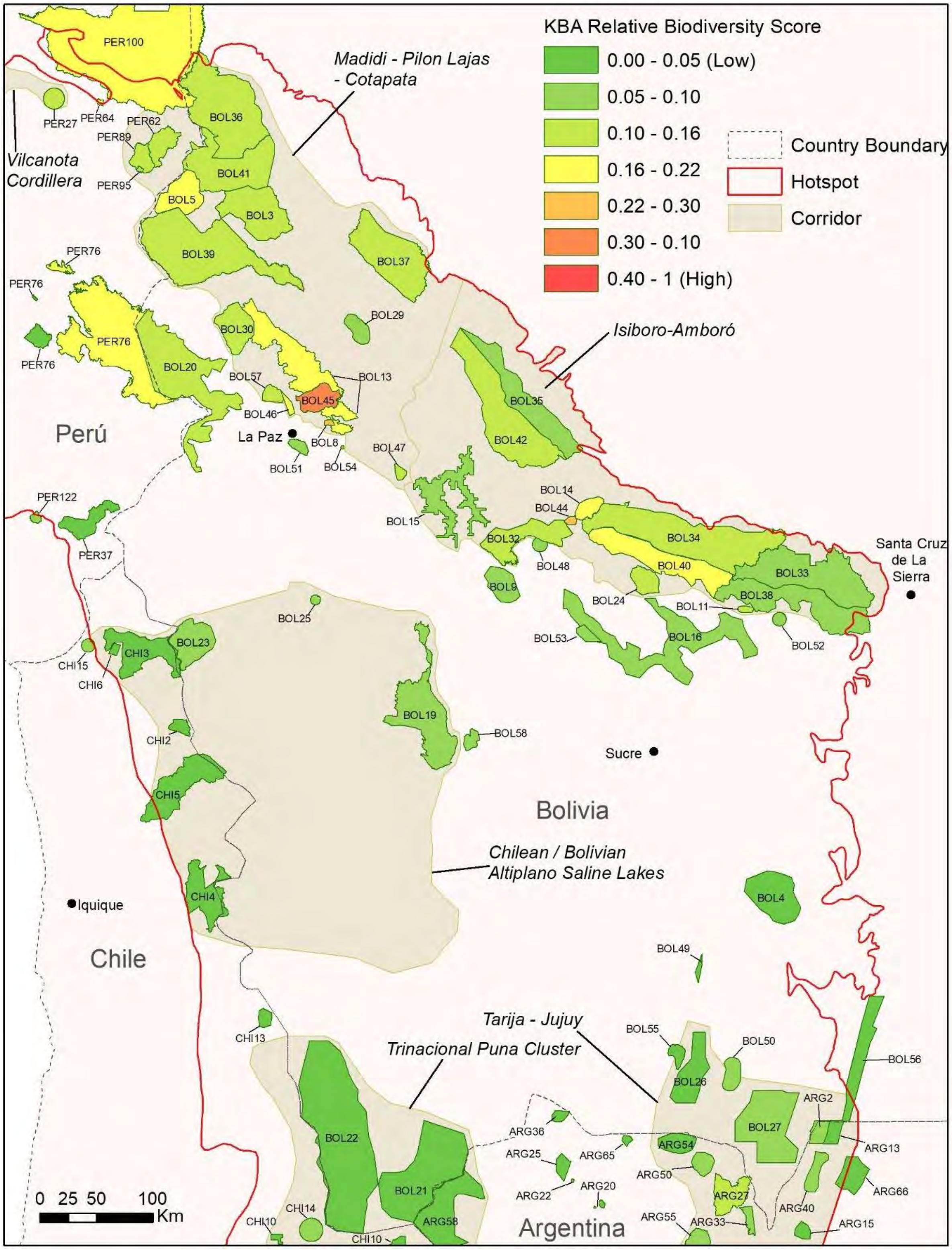


Table 5.7. KBAs in Bolivia

KBA name	CEPF code	Area (ha)	Protection*	Corridor	RBV	Other
Anexo Tuni-Condoriri†	BOL57	19,462	Not protected	Madidi-Pilón Lajas-Cotapata	0.14	
Apolo	BOL3	177,302	Partially protected	Madidi-Pilón Lajas-Cotapata	0.14	IBA AZE
Azurduy	BOL4	133,353	Not protected	-----	0.03	IBA
Bosque de Polylepis de Madidi	BOL5	94,613	Protected	Madidi-Pilón Lajas-Cotapata	0.21	IBA
Bosque de Polylepis de Taquesi	BOL8	3,455	Not protected	Madidi-Pilón Lajas-Cotapata	0.29	IBA
Candelaria-Corani†	BOL44	5,663	Not protected	Isiboro-Amboró	0.24	
Cerro Azanaques†	BOL58	15,249	Not protected	-----	0.07	
Cerro Q'ueñwa Sandora	BOL9	57,875	Not protected	-----	0.07	IBA
Choquecamiri†	BOL47	8,585	Not protected	Madidi-Pilón Lajas-Cotapata	0.13	
Cochabamba	BOL48	10,268	Partially protected	Isiboro-Amboró	0.09	AZE
Comarapa	BOL11	5,888	Partially protected	Isiboro-Amboró	0.13	AZE
Cotapata	BOL13	227,549	Not protected	Madidi-Pilón Lajas-Cotapata	0.16	AZE
Cristal Mayu y alrededores	BOL14	29,440	Not protected	Isiboro-Amboró	0.22	IBA
Cuenca Cotacajes	BOL15	143,104	Not protected	Isiboro-Amboró	0.10	IBA AZE
Cuencas de Ríos Caine y Mizque	BOL16	339,205	Partially protected	-----	0.05	IBA
Culpina	BOL49	5,494	Not protected	-----	0.05	AZE
Lago Poopó y Río Laka Jahuira	BOL19	239,129	Protected	Lagos Salinos del Altiplano chileno/boliviano	0.06	IBA
Lago Titicaca (Sector Boliviano)	BOL20	368,971	Protected	-----	0.15	IBA AZE
Lagunas de Agua Dulce del Sureste de Potosí	BOL21	310,647	Protected	Puna Trinacional	0.02	IBA
Lagunas Salinas del Suroeste de Potosí	BOL22	611,736	Protected	Puna Trinacional	0.04	IBA
Mallasa-Taypichullo†	BOL51	13,498	Not protected	-----	0.10	
Pampa Redonda	BOL52	10,163	Not protected	-----	0.09	AZE
Parque Nacional Sajama	BOL23	97,237	Partially protected	Lagos Salinos del Altiplano chileno/boliviano	0.07	IBA
Parque Nacional Torotoro	BOL53	15,271	Protected	-----	0.07	
Parque Nacional Tuni Condoriri†	BOL46	8,345	Protected	Madidi-Pilón Lajas-Cotapata	0.23	
Parque Nacional y Área Natural de Manejo Integrado Cotapata†	BOL45	57,238	Protected	Madidi-Pilón Lajas-Cotapata	0.35	
Quebrada Mojón	BOL24	40,426	Not protected	Isiboro-Amboró	0.12	IBA

KBA name	CEPF code	Area (ha)	Protection*	Corridor	RBV	Other
Reserva Biológica Cordillera de Sama	BOL26	96,224	Protected	Tarija-Jujuy	0.03	IBA
Reserva Nacional de Flora y Fauna Tariquía	BOL27	222,760	Protected	Tarija-Jujuy	0.08	IBA
Río Caballuni	BOL54	697	Not protected	-----	0.10	AZE
Río Guadalquivir	BOL50	31,836	Not protected	Tarija-Jujuy	0.06	AZE
Río Huayllamarca	BOL25	5,209	Not protected	Lagos Salinos del Altiplano chileno/boliviano	0.07	AZE
Río San Juan tributario oeste área pre puna	BOL55	16,283	Partially protected	Tarija-Jujuy	0.01	AZE
Serranía Bella Vista	BOL29	33,391	Not protected	Madidi-Pilón Lajas-Cotapata	0.08	IBA
Serranía de Aguaragüe	BOL56	99,979	Protected	Tarija-Jujuy	0.05	IBA
Tacacoma-Quiabaya y Valle de Sorata	BOL30	87,333	Not protected	Madidi-Pilón Lajas-Cotapata	0.13	IBA
Vertiente Sur del Parque Nacional Tunari	BOL32	128,147	Protected	Isiboro-Amboró	0.13	IBA
Yungas Inferiores de Amboró	BOL33	299,926	Protected	Isiboro-Amboró	0.08	IBA
Yungas Inferiores de Carrasco	BOL34	425,537	Protected	Isiboro-Amboró	0.15	IBA
Yungas Inferiores de Isiboro-Sécure/Altamachi	BOL35	193,812	Protected	Isiboro-Amboró	0.09	IBA
Yungas Inferiores de Madidi	BOL36	372,951	Protected	Madidi-Pilón Lajas-Cotapata	0.14	IBA
Yungas Inferiores de Pilón Lajas	BOL37	249,857	Protected	Madidi-Pilón Lajas-Cotapata	0.12	IBA
Yungas Superiores de Amboró	BOL38	245,394	Protected	Isiboro-Amboró	0.09	IBA
Yungas Superiores de Apolobamba	BOL39	436,794	Protected	Madidi-Pilón Lajas-Cotapata	0.15	IBA AZE
Yungas Superiores de Carrasco	BOL40	205,748	Protected	Isiboro-Amboró	0.19	IBA AZE
Yungas Superiores de Madidi	BOL41	240,426	Protected	Madidi-Pilón Lajas-Cotapata	0.14	IBA
Yungas Superiores de Mosetenes y Cocapata	BOL42	337,229	Partially protected	Isiboro-Amboró	0.12	IBA

* Protected: > 80 percent overlap with a protected area.
Partially protected: 10-80 percent overlap.
Not protected: < 10 percent overlap. See the section 5.4 on protection of KBA for more information on designations.
† Nominated KBA.

Argentina

The southernmost portions of the humid montane forests and puna grasslands of the hotspot reach into Argentina, where 76 KBAs were identified (Figure 5.6), covering an area of 2,398,807 hectares or 16 percent of the Argentinean section of the hotspot (Table 5.2). These KBAs have an average area of 56,607 hectares but range from 370 hectares to 848,373 hectares (Table 5.8). None of the KBAs confirmed in the previous ecosystem profile have been removed, but 11 KBA were added in the profile update, increasing the number of KBAs from 65 to 76 (Appendix 5.3). Although Argentina has a great diversity of habitats, all its KBAs have low RBVs reflecting the wide distribution and low threat status of their species and lower biodiversity due to being in subtropical areas.

The KBAs with the highest RBVs are found in forests on the eastern slopes of the Andes and the rest in the dry grasslands and scrub of the altiplano or puna. A few threatened species are found in humid forests. One such example is the Tucumán amazon, also known as the alder amazon (*Amazona tucumana*, VU), a parrot restricted to northern Argentina and southern Bolivia with an important population stronghold in the El Rey National Park (ARG30). Another is the Calilegua's marsupial frog (*Gastrotheca christiani*, CR) endemic to Argentina, and with a distribution that covers parts of the Parque Nacional Calilegua (ARG28) and Valle Colorado and Valle Grande (ARG62), in the Tarija-Jujuy Corridor. The only globally threatened fungus in the hotspot, *Stilbohypoxylon macrosporum* (CR), known only from the Argentinian yungas, is also found here. Most of the highest RBV KBAs for the country are small and located in forested areas also known as "Yungas Argentinas". Here, ongoing conservation efforts have succeeded in limiting logging and forest conversion to some extent (CEPF 2015). KBAs in the Altiplano, such as the Sistema de Lagunas de Vilama-Pululos (ARG8), encompass national parks with lakes that support important concentrations of flamingos.

Figure 5.6 KBAs in the Argentinean and Chilean Regions of the Tropical Andes Hotspot

Table 5.8. KBAs in Argentina

KBA name	CEPF code	Area (ha)	Protection*	Corridor	RBV	Other
Abra Grande	ARG1	32,429	Partially protected	Tarija-Jujuy	0.06	IBA
Acambuco	ARG2	23,475	Partially protected	Tarija-Jujuy	0.07	IBA
Alto Calilegua	ARG3	774	Protected	Tarija-Jujuy	0.12	IBA
Caspalá-Santa Ana	ARG4	14,612	Protected	Tarija-Jujuy	0.06	IBA
Cerro Negro de San Antonio	ARG5	9,934	Not protected	-----	0.08	IBA
Chaco de Tartagal	ARG66	50,125	Not protected	Tarija-Jujuy	0.03	IBA
Cuesta de las Higuerillas	ARG6	7,157	Not protected	-----	0.08	IBA
Cuesta del Clavillo	ARG7	9,144	Partially protected	Yungas de Tucumán	0.08	IBA
Cuesta del Obispo	ARG8	25,434	Not protected	-----	0.05	IBA
Cuesta del Totoral	ARG9	7,733	Not protected	-----	0.06	IBA
El Fuerte y Santa Clara	ARG10	17,891	Not protected	-----	0.06	IBA
El Infiernillo	ARG11	707	Not protected	Yungas de Tucumán	0.09	IBA
Fincas Santiago y San Andrés	ARG12	32,942	Protected	Tarija-Jujuy	0.10	IBA
Itiyuro-Tuyunti	ARG13	20,947	Partially protected	Tarija-Jujuy	0.05	IBA
La Cornisa	ARG14	19,444	Protected	-----	0.09	IBA
La Porcelana	ARG15	13,276	Partially protected	Tarija-Jujuy	0.05	IBA
Laguna El Peinado	ARG67	7,803	Protected	-----	0.01	IBA
Laguna Grande	ARG16	7,671	Protected	-----	0.00	IBA
Laguna Guayatayoc	ARG17	108,520	Not protected	-----	0.02	IBA
Laguna La Alumbrera	ARG18	10,796	Not protected	-----	0.01	IBA
Laguna Purulla	ARG19	7,796	Protected	-----	0.01	IBA
Lagunas Runtuyoc-Los Enamorados	ARG20	2,493	Not protected	-----	0.02	IBA
Lagunas San Miguel y El Sauce	ARG21	2,213	Not protected	-----	0.09	IBA
Lagunillas	ARG22	550	Protected	-----	0.02	IBA
Llanos de Jagüé	ARG68	45,842	Not protected	-----	0.00	IBA
Lotes 32 y 33, Maíz Gordo	ARG23	23,031	Partially protected	-----	0.03	IBA
Luracatao y Valles Calchaquíes	ARG24	267,288	Not protected	-----	0.02	IBA
Monumento Natural Laguna de Los Pozuelos	ARG25	15,870	Protected	-----	0.03	IBA

KBA name	CEPF code	Area (ha)	Protection*	Corridor	RBV	Other
Pampichuela	ARG26	1,827	Protected	Tarija-Jujuy	0.10	IBA
Parque Nacional Baritú	ARG27	65,123	Protected	Tarija-Jujuy	0.12	IBA
Parque Nacional Calilegua	ARG28	68,333	Protected	Tarija-Jujuy	0.12	IBA
Parque Nacional Campo de los Alisos	ARG29	9,043	Protected	Yungas de Tucumán	0.07	IBA
Parque Nacional El Rey	ARG30	35,915	Protected	-----	0.06	IBA
Parque Nacional Los Cardones	ARG69	58,579	Protected	-----	0.03	IBA
Parque Provincial Cumbres Calchaquíes	ARG31	61,224	Protected	Yungas de Tucumán	0.06	IBA
Parque Provincial La Florida	ARG32	8,392	Protected	Yungas de Tucumán	0.10	IBA
Parque Provincial Laguna Pintascayoc	ARG33	14,227	Protected	Tarija-Jujuy	0.09	IBA
Parque Provincial Los Ñuñorcos y Reserva Natural Quebrada del Portugués	ARG34	6,760	Protected	Yungas de Tucumán	0.11	IBA
Pueblo Nuevo	ARG35	1,750	Protected	-----	0.01	AZE
Quebrada de Escoipe	ARG70	637	Not protected	-----	0.03	AZE
Quebrada de las Conchas	ARG71	54,564	Partially protected	Yungas de Tucumán	0.08	IBA
Quebrada del Toro	ARG37	54,938	Not protected	-----	0.04	IBA AZE
Queñoales de Santa Catalina	ARG36	9,729	Protected	-----	0.02	IBA
Reserva de la Biósfera Parque Nacional San Guillermo	ARG72	848,373	Protected	-----	0.01	IBA
Reserva Natural de La Angostura	ARG41	1,507	Protected	Yungas de Tucumán	0.12	IBA
Reserva Natural Las Lancitas	ARG42	12,008	Partially protected	-----	0.06	IBA
Reserva Provincial de Uso Múltiple Laguna Leandro	ARG43	369	Protected	Tarija-Jujuy	0.06	IBA
Reserva Provincial Laguna Brava	ARG73	389,369	Protected	-----	0.00	IBA
Reserva Provincial Olaroz-Cauchari	ARG44	190,097	Protected	Puna Trinacional	0.01	IBA
Reserva Provincial Santa Ana	ARG45	15,586	Protected	Yungas de Tucumán	0.05	IBA
Reserva Provincial y de la Biósfera Laguna Blanca	ARG46	522,754	Protected	-----	0.01	IBA
Río Los Sosa	ARG38	2,436	Protected	Yungas de Tucumán	0.06	IBA
Río Santa María	ARG39	9,339	Protected	Tarija-Jujuy	0.08	IBA
Río Seco	ARG40	30,654	Protected	Tarija-Jujuy	0.07	IBA
Salar del Hombre Muerto	ARG47	58,810	Not protected	-----	0.01	IBA
San Francisco-Río Jordán	ARG48	9,894	Protected	Tarija-Jujuy	0.12	IBA

KBA name	CEPF code	Area (ha)	Protection*	Corridor	RBV	Other
San Lucas	ARG49	25,925	Partially protected	Tarija-Jujuy	0.05	IBA
Santa Victoria, Cañani y Cayotal	ARG50	25,542	Partially protected	Tarija-Jujuy	0.07	IBA
Sierra de Ambato	ARG51	76,195	Not protected	-----	0.06	IBA
Sierra de Medina	ARG52	38,389	Not protected	Yungas de Tucumán	0.08	IBA
Sierra de Metán	ARG74	61,707	Not protected	Yungas de Tucumán	0.11	IBA
Sierra de San Javier	ARG53	11,792	Protected	Yungas de Tucumán	0.07	IBA
Sierra de Santa Victoria	ARG54	38,982	Not protected	Tarija-Jujuy	0.02	IBA
Sierra de Zenta	ARG55	37,688	Protected	Tarija-Jujuy	0.09	IBA
Sierra Rosario de la Frontera	ARG75	26,563	Not protected	Yungas de Tucumán	0.06	IBA
Sierras de Carahuasi	ARG56	102,694	Partially protected	Yungas de Tucumán	0.05	IBA
Sierras de Puesto Viejo	ARG57	9,075	Not protected	-----	0.08	IBA
Sistema de lagunas de Vilama-Pululos	ARG58	303,783	Protected	Puna Trinacional	0.01	IBA
Socompa y Llullaillaco	ARG59	87,293	Protected	-----	0.01	IBA
Tiraxi y Las Capillas	ARG60	13,008	Protected	-----	0.11	IBA
Trancas	ARG61	32,091	Not protected	Yungas de Tucumán	0.10	IBA
Valle Colorado y Valle Grande	ARG62	9,743	Protected	Tarija-Jujuy	0.10	IBA
Valle de Tafi	ARG63	33,550	Not protected	Yungas de Tucumán	0.10	AZE
Yala	ARG64	4,089	Protected	-----	0.06	IBA
Yavi y Yavi Chico	ARG65	4,569	Not protected	-----	0.02	IBA
Yuto y Vinalito	ARG76	31,277	Not protected	Tarija-Jujuy	0.08	IBA

* Protected: > 80 percent overlap with a protected area.
Partially protected: 10-80 percent overlap.
Not protected: < 10 percent overlap. See the section 5.4 on protection of KBA for more information on designations.

Chile

In Chile, the hotspot is located entirely on the semi-desertic altiplano where there are 12 KBAs (Figure 5.5, 5.6) covering a total area of 495,771 hectares, equivalent to 7 percent of the Chilean section of the hotspot (Table 5.2). Since the previous ecosystem profile four KBAs were confirmed and three were removed (Appendix 5.3). The KBAs have small areas, and with an average size of 48,917 hectares, they have the lowest country average in the Tropical Andes and range from 804 hectares to 153,662 hectares (Table 5.9). Some KBAs correspond with national parks, reserves and national monuments. Although there are several endemic species in the KBAs, all with low RBVs, they form part of the distribution of only 12 Endangered and Critically Endangered species. These include the Chilean woodstar (*Eulidia yarellii*, CR), which inhabits river valleys in desert areas, and the Critically Endangered amphibians *Telmatobius pefauri*, *T. philippii*, and *T. vilamensis*. Several of the KBAs, such as

Lagunas Bravas (CHI1), the Monumento Natural Salar de Surire (CHI2) and Parque Nacional Lauca (CHI3) in the Saline Lakes Corridor of the Chilean/Bolivian Altiplano (Figure 5. 5), support locally important populations of aquatic birds such as ducks and geese, James's flamingo (*Phoenicoparrus jamesi*), Andean flamingo (*Phoenicoparrus andinus*, VU) and horned coot (*Fulica cornuta*).

The direct and indirect impacts of the mining industry constitute a major threat to KBAs in Chile (CEPF 2015). One of the most significant adverse effects of this activity is the use of large volumes of water. Mining operations extract water from deep underground aquifers, thereby reducing the amount of water available for spring-fed wetlands. Water is a scarce resource in this environment and is vital for the maintenance of aquatic birds, for which several of the KBAs were defined.

Table 5.9. KBAs in Chile

KBA name	CEPF code	Area (ha)	Protection*	Corridor	RBV	Other
Laguna del Negro Francisco y Laguna Santa Rosa	CHI12	54,693	Partially protected	-----	0.029	IBA
Lagunas Bravas	CHI1	804	Not protected	-----	0.011	IBA
Monumento Natural Salar de Surire	CHI2	15,814	Protected	Lagos Salinos del Altiplano chileno/boliviano	0.021	IBA
Murmuntani	CHI13	13,539	Not protected	-----	0.046	AZE
Parque Nacional Lauca	CHI3	127,977	Protected	Lagos Salinos del Altiplano chileno/boliviano	0.027	IBA
Parque Nacional Salar de Huasco	CHI4	108,221	Not protected	Lagos Salinos del Altiplano chileno/boliviano	0.033	IBA
Parque Nacional Volcán Isluga	CHI5	153,662	Protected	Lagos Salinos del Altiplano chileno/boliviano	0.024	IBA
Precordillera Socoroma-Putre	CHI6	5,848	Not protected	Lagos Salinos del Altiplano chileno/boliviano	0.026	IBA
Reserva Nacional Los Flamencos-Soncor	CHI10	66,430	Protected	Puna Trinacional	0.024	IBA
Río Vilama	CHI14	27,808	Not protected	Puna Trinacional	0.06	AZE
Salar de Piedra Parada	CHI11	2,715	Not protected	-----	0.013	IBA
Zapahuira	CHI15	9,482	Not protected	Lagos Salinos del Altiplano chileno/boliviano	0.08	AZE

* Protected: > 80 percent overlap with a protected area.
Partially protected: 10-80 percent overlap.
Not protected: < 10 percent overlap. See the section 5.4 on protection of KBA for more information on designations.

5.3 Relative Biodiversity Value (RBV)

Across the hotspot, the RBV varies substantially depending on the number of species in each threat category and the size of their distribution (Figure 5.7). Regionally, a latitudinal gradient is found with higher RBVs in the northern Andean countries (Venezuela, Colombia, Ecuador) and lower RBVs towards the central (Peru and Bolivia) and southern (Chile and Argentina) countries. This is consistent with the known pattern of higher biodiversity towards zero latitude. The high biodiversity and endemism of the northern Andes could be explained by greater topographic heterogeneity and ecosystem diversity generated by several mountain ranges of different geological origins (Distler *et al.* 2009; Kattan *et al.* 2004). However, there is evidence that water and energy availability, regional and evolutionary history of species and their dispersal ability are as, or more, important drivers of speciation than landscape changes (Jiménez *et al.* 2009; Ricklefs 2004; Smith *et al.* 2014). Additionally, the hotspot regions of Andean countries such as Bolivia, Peru, Chile and Argentina have large areas of altiplano, high-altitude deserts that are less diverse than the montane forests that predominate in Colombia and Ecuador. On the other hand, the northern Andean countries have better representation in the IUCN Red List (IUCN 2020). Colombia is the country with the highest number of animal species assessed (6,845 species), and Ecuador the third (4,687 species), followed by Venezuela (4,580 species). Although Peru is not among the northern Andean countries, it seems to have been well assessed as it is in second place (4,994 species). In terms of plants assessed, Ecuador holds first place (4,724 species), Colombia second (4,268 species), and Peru third (3,031 species), followed by Venezuela (2,856 species).

At the local level, there is an altitudinal gradient where the RBVs are higher in the mountain ranges and lower towards the inter-Andean valleys or flat areas of lower elevation, possibly due to the greater number of species with restricted distribution found in the mountain ranges. Likewise, for taxonomic groups such as birds (Kattan *et al.* 2004), amphibians (Armesto and Señaris 2017) and some plants (Salazar *et al.* 2015; Jørgensen *et al.* 2011), there is a correlation between their diversity and elevation-related factors such as precipitation and temperature, with higher species diversity at medium elevations, between 1000 m and 3000 m above sea level. In addition to its biodiversity and endemism, the RBV of this northern Andean zone is possibly higher because habitat transformation and deforestation for agriculture and cattle ranching is higher in this region (Wassenar *et al.* 2007). This is corroborated in this profile's hotspot ecosystem integrity impact assessment (Chapter 6), which takes into account threats such as cattle ranching, agriculture and mining, among others, and shows higher threat levels for Colombia and Ecuador, compared to Bolivia, Peru, Chile and Argentina.

According to the classification of KBAs, based on the RBV natural breaks, 46 KBAs were identified as very high, 115 as high, 114 as medium, 114 as low and 85 as very low RBV (Figure 5.8). More KBAs with higher RBVs were found in the northern Andean countries than in the central and southern Andes. All very high RBV KBAs are located in Colombia (29) and Ecuador (17). High and medium RBV KBAs are distributed among Venezuela (15 and 10, respectively), Colombia (57 and 29), Ecuador (38 and 31), Peru (2 and 35) and Bolivia (3 and 9). In Venezuela, Colombia and Ecuador, no very low RBV KBAs were found. All KBAs in Argentina and Chile have low and very low RBVs. For more details on the methodology, see Appendix 5.4.

Figure 5.7. Relative Biodiversity Value (RBV) of the Tropical Andes Hotspot

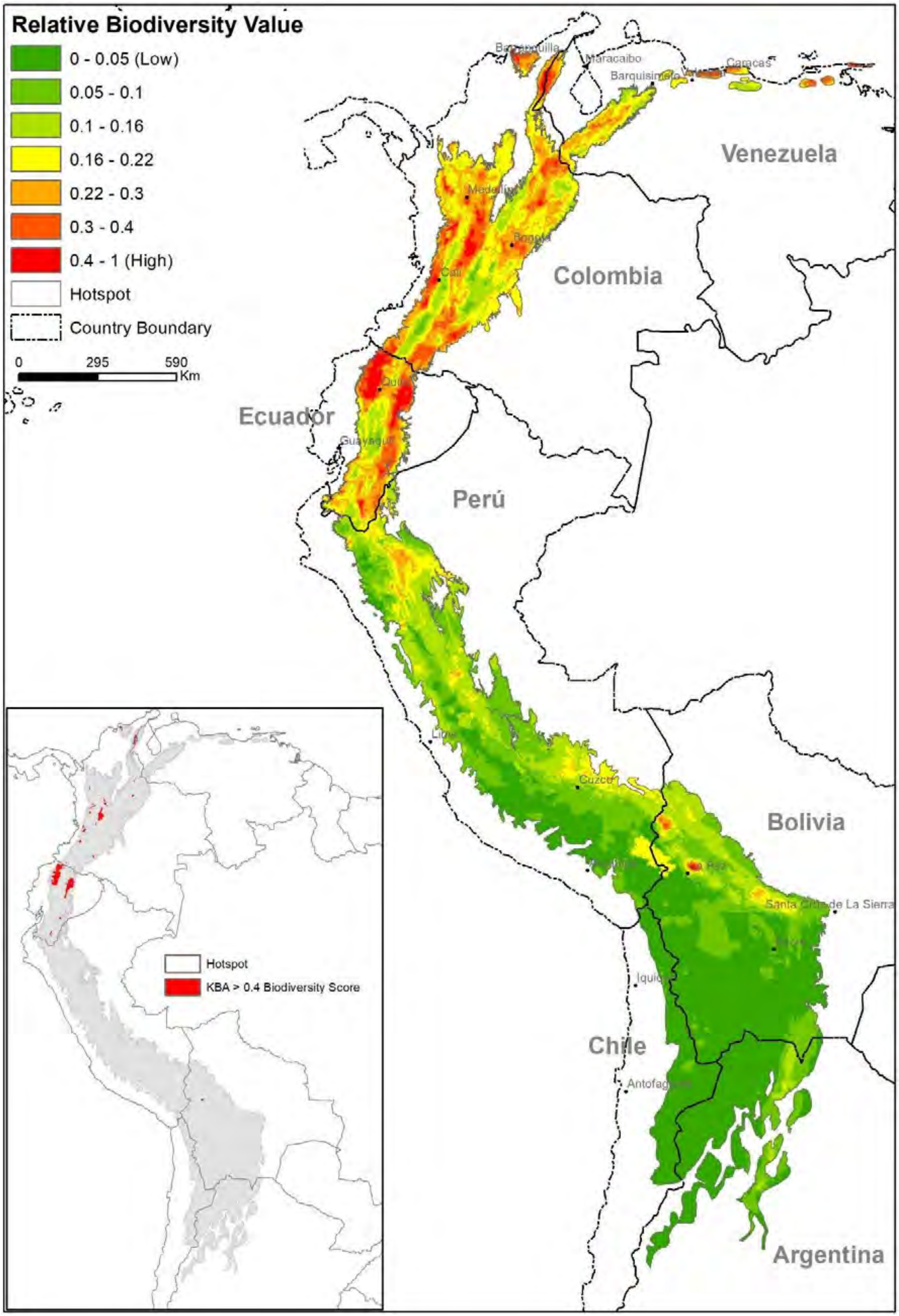
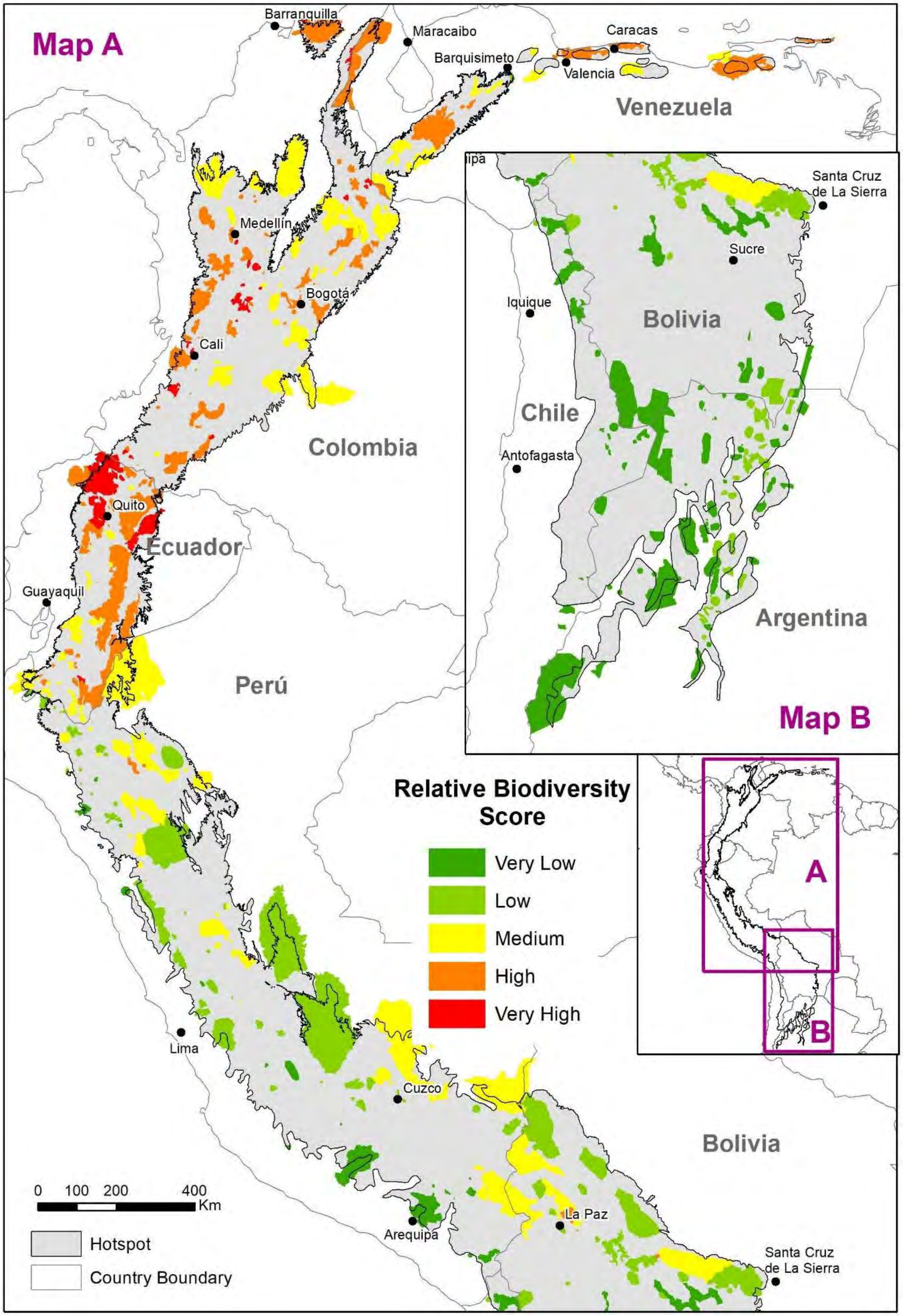


Figure 5.8. Relative Biodiversity Value (RBV) of KBAs in the Tropical Andes Hotspot



5.4 Legal Protection of KBAs

Andean governments, local communities, international donors and conservationists have invested enormous effort over the previous decades in establishing new protected areas in the Tropical Andes Hotspot. In the previous profile, 606 national and subnational protected areas were recorded, while as of October 2020, the date of preparation of this analysis, 2,960 protected areas were identified within or partially within the hotspot (Table 5.10).[3] Of this number 2,848 correspond to national, subnational and private protected areas, and 112 areas with international designations such as Ramsar sites, Biosphere Reserves and other effective area-based conservation modalities (OMEC, by its acronym in Spanish) established for each country.[4] Together, these protected areas cover 43 million hectares, or 27 percent of the hotspot area (Table 5.10). Within each country, the percentage of the hotspot under protection varies from a low of 11 percent in Chile to a high of 49 percent in Ecuador.

The protection status of hotspot KBAs is variable, with around 63 percent of the area under KBAs (within or partially within the hotspot) overlapping with a protected area, the remaining 37 percent is unprotected (Table 5.10). Of the 474 KBAs in the Tropical Andes, about 42 percent, or 199 sites, have at least 80 percent of their territory under some form of protection (Table 5.11). These protected KBAs cover about 23 million hectares, an area about the size of the United Kingdom, which is equivalent to 53 percent of the total area covered by KBAs. These 199 KBAs include 75 sites of high and very high RBV, (Figure 5.8) and 34 are AZE sites. A further 102 KBAs, which include 47 sites of high or very high RBV and 24 that are AZE sites, have intermediate levels of protection, meaning that between 10 and 80 percent of their area overlaps with a protected area. These KBAs cover 13 million hectares or 29 percent of the total area with KBA designation, an area similar to the size of Nicaragua. The remaining 173 KBAs, 36 percent of all KBAs in the hotspot, which include 41 sites rated as high and very high RBV, as well as 44 KBAs that are AZE sites, are not protected. These sites cover just over 7 million hectares, an area equivalent to the size of Ireland.

It is important to note that the mapping information available on government open data portals contains up-to-date information available and accessible for the analysis of protection for biodiversity conservation in the Tropical Andes Hotspot, something that may not have been available for the previous profile. However, in the case of Venezuela, the availability of mapping data for protected areas was limited, because their information download portals are deactivated or the information is not available. Likewise, World Heritage sites have not been considered, due to the lack of information available for this conservation category. Conservation strategies that are not recognized as protected areas by national governments and do not have a consolidated GIS layer available for the entire country, such as municipal protected areas in Colombia and Conservation and Sustainable use Areas in Ecuador, were not considered.

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

[4] Other effective area-based conservation modalities (OMECs by its acronym in Spanish) include: Gran Chaco Corridors for Argentina; Forest Reserve Law 1959 and Protective Productive Forest Reserves for Colombia; PSB Conservation Areas and Water Protection Areas 2020 for Ecuador; and Conservation Concessions, Ecotourism Concession, Concessions for Forest Products Other than Timber and Wildlife Concession for Peru.

Table 5.10. Protection Areas for Biodiversity Conservation in the Tropical Andes Hotspot

Protected area unit		Venezuela	Colombia	Ecuador	Peru	Bolivia	Argentina	Chile	Tropical Andes Hotspot
National Areas	Number	31	84	33	41	21	9	7	226
	Area (ha)	1,901,862	3,888,203	2,710,975	5,627,427	5,642,593	347,253	766,170	20,884,483
Subnational Areas	Number	Does not exist	234	3	13	76	27	Does not exist	353
	Area (ha)		2,730,013	95,040	759,022	1,522,385	2,618 418		7,724,878
Private Areas	Number	Does not exist	561	1,637	71	Does not exist	No information	No information	2,269
	Area (ha)		50,290	381,797	287,350				719,438
Ramsar Sites	Number	0	5	4	6	5	4	6	30
	Area (ha)		188,469	96,325	101,494	4 108 715	649,410	53,143	5,197,555
Biosphere Reserves	Number	0	2	5	5	Does not exist	4	1	17
	Area (ha)		3,418,283	3,179,547	5,198,604		2,061,159	326,466	14,184,058
OECM‡	Number	No information	No information	No information	64	No information	1	No information	65
	Area (ha)				739,450		261,429		1,000,879
Total protected areas in the hotspot per country		31	886	1,682	200	102	45	14	2,960
Total hotspot area under protection (ha)*.		1,901,862	9,034,802	5,737,404	10,004,274	9,923,062	5,349,966	810,671	42,762,042
Hotspot area per country (ha)		6,952,395	35,028,997	11,786,708	45,326,966	37,000,978	14,872,835	7,384,220	158,353,100
% of total hotspot area under protection		27%	26%	49%	22%	27%	36%	11%	27%
Total area of KBAs under protection (ha)		2,732,964	5,440,424	3,246,987	8,134 591	5,087,573	2,925,265	395,636	27,963,440
KBA area per country (ha)		4,349,607	7,878,654	4,708,664	14,393,717	6,777,212	4,302,130	586,998	44,457,120
% area of KBA under protection		63%	69%	69%	57%	75%	68%	67%	63%

‡ Other effective area-based conservation modalities.
***** The total area of the hotspot under protection is the sum of the area of all categories, minus areas where two or more categories overlap. Includes national, sub-national and private protected areas and areas with international designations where conservation is the primary management objective. It does not include indigenous territories or other land tenure regimes where biodiversity conservation or natural resource management is not the main objective. In Venezuela, the availability of protected area mapping data was limited.

Table 5.11. KBAs and AZE sites under legal protection

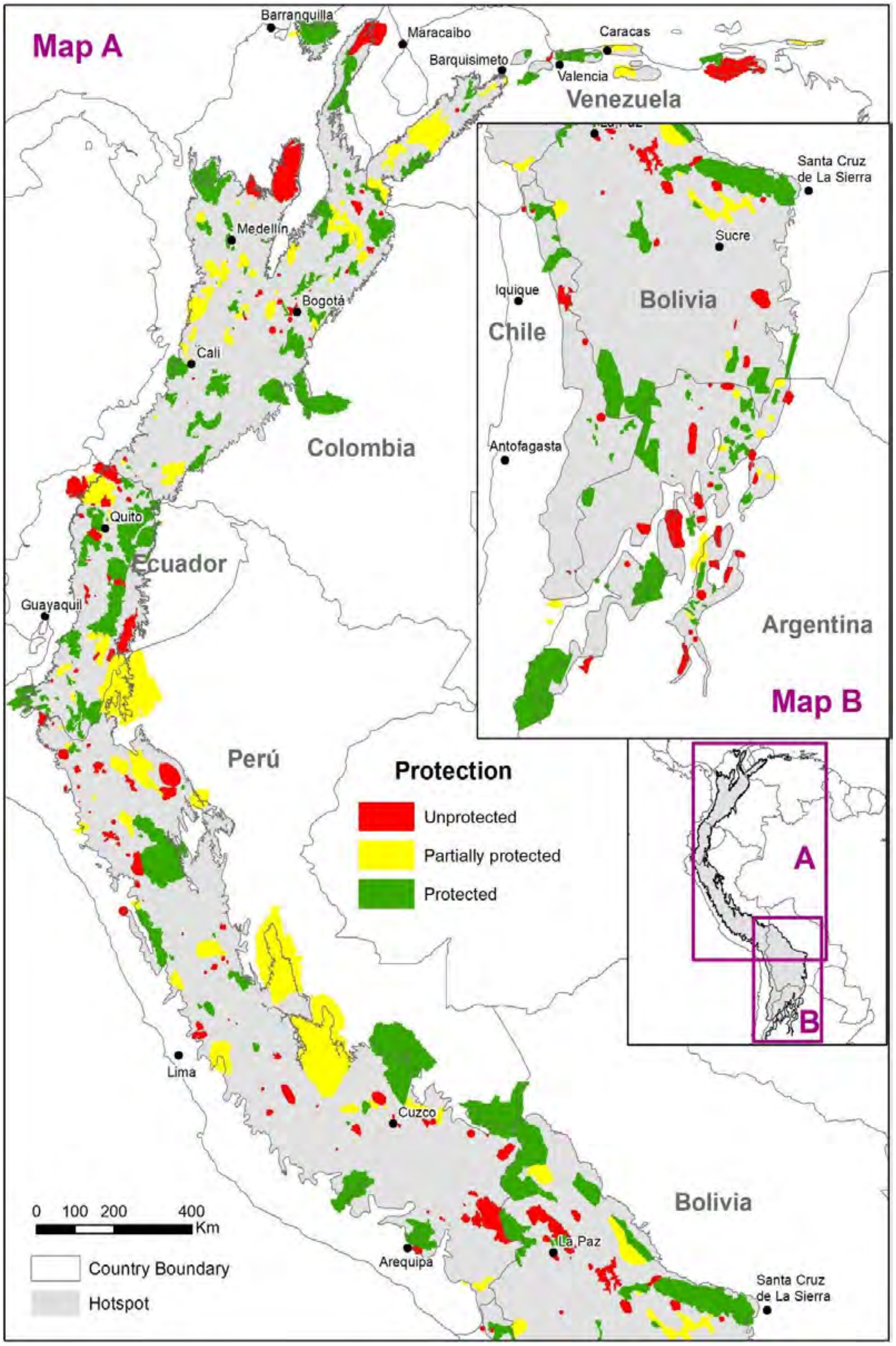
	Protected*	Partially Protected*	Not protected*	Total
Number of KBAs	199 (42%)	102 (22%)	173 (36%)	474
Area of KBAs in hectares	22,916,738 (53%)	13,059,769 (30%)	7,021,753 (16%)	42,998,260
Number of KBAs with high and very high RBVs	75 (46%)	47 (29%)	41 (25%)	162
Number of AZE sites	34 (33%)	24 (24%)	44 (43%)	102

* Protected: > 80 percent overlap with a protected area.
Partially protected: 10-80 percent overlap.
Not protected: < 10 percent overlap.

It should also be noted that this analysis of protected areas takes into account different forms of conservation protection. However, the level of protection afforded to species and sites varies according to the form and even according to the capacities of governments or civil society organizations to manage and administer each of these conservation strategies. However, some KBAs may overlap with indigenous territories or other land management designations that were not considered but which afford them protection even though they do not necessarily have biodiversity conservation as a management objective. Indigenous reservations, for example, often have a form of communal land ownership that may have sustainable natural resource management as an objective.

Despite these advances in conservation strategies, 73 percent of the land in the Tropical Andes Hotspot, equivalent to 115 million hectares, an area about the size of Colombia, is still unprotected. This suggests that the implementation of activities in these KBAs is an important alternative to complement the conservation efforts that have been carried out in the hotspot in recent decades. This strategy could not only contribute to the strengthening of protected areas but also to the formation of new protected areas and new conservation and sustainable development areas where the main actors are civil society organizations in coordination with national or sub-national environmental institutions.

Figure 5.9. Status of Public Protection of KBAs in the Tropical Andes Hotspot



Protected: > 80 percent overlap with a protected area.
Partially protected: 10-80 percent overlap.
Not protected: < 10 percent overlap.

5.5 Ecosystem Services of the KBAs

Water availability

Besides being places with amazing biodiversity and species endemism, tropical montane ecosystems are important areas for water for human consumption, agricultural use, and hydropower generation in Andean countries. Cloud and rain forests, yungas and páramos are among the ecosystems that capture water, either from frequent precipitation or fog, and suffer little evaporation losses due to high atmospheric humidity and cloudiness (Aparecido *et al.* 2018; Bruijnzeel *et al.* 2011). Páramos also have a good capacity for water storage thanks to their porous soil type, which is rich in organic matter. Forests also help prevent soil erosion and landslides, and this contributes to better water quality.

As the demand for food increases, water scarcity is becoming more and more imminent, so much so that in California, USA, water began to be traded on the Wall Street futures market in December 2020 (Redacción Medio Ambiente, 2020). Of the water consumed globally, 92 percent is used for agriculture. Much of this is wasted by irrigation systems that lose water through evaporation or soils through which water drains before it can be absorbed by roots ("The best way to solve the world's water woes is to use less of it", 2020). Strategies to secure the resource for people and biodiversity include regenerative soil agriculture systems that increase carbon sequestration and water storage (White 2020) and the conservation of sites that are important for water provision.

To determine the importance of sites in their capacity to provide water in the Tropical Andes Hotspot, KBAs were ranked according to total water availability (Table 5.12, for details of the methodology, see Appendix 5.6). Of the 474 KBAs assessed, five were rated with "Very High" water availability, and 15 were rated "High". The KBAs with very high water availability in the Tropical Andes Hotspot are located on the eastern slopes of the Andes Cordillera in Peru (Figure 5.10): Cordillera del Cóndor (PER31), Cordillera Vilcabamba (PER33), Reserva Comunal El Sira (PER81), Manu (PER60), Bahuaja-Sonene (PER100). The latter two are located largely outside the hotspot boundary, largely in the Amazon, yet all share characteristics of the Andes. These KBAs are the ones with the highest water availability in this analysis possibly due to their large surface area, an important caveat for this methodology. There are KBAs located in ecosystems such as páramos and Andean forests that are very important for the hotspot's water supply and storage but did not particularly stand out due to their relatively smaller areas.

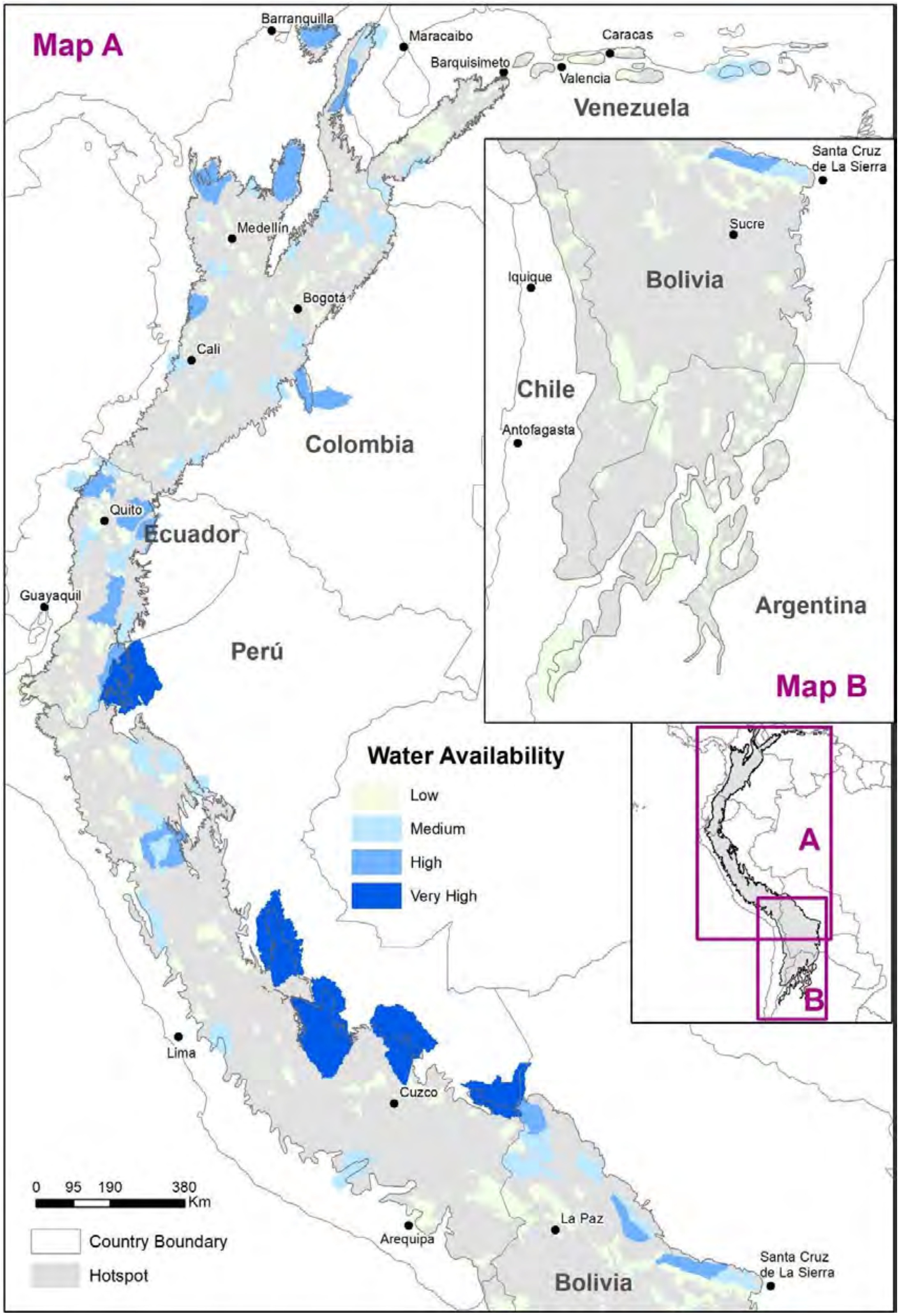
The high value KBAs are scattered in the Andes Mountains, mostly in Colombia, Ecuador and Bolivia (Figure 5.10). The 15 KBAs with high hotspot water availability include: Serranía de San Lucas (COL108), Parque Nacional Natural Sierra de la Macarena (COL71), Parque Nacional Natural Paramillo (COL69), Yungas Inferiores de Carrasco (BOL34), Parque Nacional Sangay (ECU51), Parque Nacional Natural Sierra de Santa Marta and its surroundings (COL110), Cordillera del Cóndor (ECU27), Río Abiseo National Park and buffer zone (PER114), Cotacachi-Cayapas Ecological Reserve (ECU61), Yungas Inferiores de Madidi (BOL36), Perijá National Park (VEN12), Serranía de los Paraguas (COL106), Yungas Superiores de Mosetenes y Cocapata (BOL42), Cayambe-Coca National Park (ECU59), and Sumaco-Napo Galeras National Park (ECU52). In contrast, all KBAs in Argentina and Chile are classified with low availability.

Table 5.12. KBA Rating for Importance of Water Provision for Domestic Use, Number of KBAs in the Tropical Andes Hotspot

Country	Number of KBAs				
	Very High	High	Medium	Low	Total
Argentina	-	-	-	76	76
Bolivia	-	3	6	38	47
Chile	-	-	-	12	12
Colombia	-	5	13	101	119
Ecuador	-	5	7	76	88
Peru	5	1	8	92	106
Venezuela	-	1	5	20	26
Total	**5**	**15**	**39**	**415**	**474**

Source Data: Mulligan 2020. AguaAndes. http://www.policysupport.org/waterworld
Model Source: Mulligan *et al.* 2010.
Classification of water availability, mm/year:
Very high: 20 696 453 - 43 908 617
High: 6 840 750 - 20 696 453
Medium: 2 145 373 - 6 840 750
Low: -1 809 550 - 2 145 373

Figure 5.10. Provisioning by KBAs of Water Availability in the Tropical Andes Hotspot



Carbon storage

Tropical Andes KBAs collectively store 7,345 million metric tons of carbon (tC) in their plant biomass (Table 5.13). This is equivalent to the amount of carbon emitted by 5,278 million passenger vehicles driven in a year, a volume that slightly exceeds Mexico's carbon budget from 2016 to 2025 to comply with the Paris Agreement (Erdes 2020). Peru's KBAs store the largest amount of carbon of all Andean countries, 3,358 million tC, or 46 percent of total carbon stored in the hotspot's KBAs. This capacity is due to the vast expanses of Peru's KBAs and the large amounts of carbon stored in them, particularly those extending into the Amazon.

The sum of carbon stored in each KBA averages 154,952 tC and varies substantially, from zero t C to 6,739,821 tC, depending on its vegetation. KBA dominated by páramos grasslands, high-altitude puna scrub or lagoons have a smaller standing biomass of carbon per unit area than KBAs dominated by high canopy forests. However, ecosystems like páramos or puna with wetlands with organic soil or peat, such as peatlands, store significant amounts of carbon that are not reflected in carbon storage calculations based on plant biomass. It is estimated that the planet's peatlands contain 600-700 GtC, exceeding the carbon stored in global vegetation, approximately 560 GtC (Turetsky *et al.* 2015).

KBAs in Colombia, Ecuador, Peru and Bolivia average more than 150 tC per hectare (Table 5.13), reflecting the dominance of forest habitats in these areas. Carbon storage is lower in Chile and Argentina, where the KBAs are characterized by shrublands and deserts rather than forests. The five KBAs with very high carbon storage are in Peru (Table 5.14): Cordillera Vilcabamba (PER33), Cordillera del Cóndor (PER31), Reserva Comunal El Sira (PER81), Manu (PER60) and Bahuaja-Sonene (PER100). The six KBAs with high carbon storage are located in Colombia, Peru and Bolivia (Table 5.14): Serranía de San Lucas (COL108), Parque Nacional Natural Sierra de la Macarena (COL71), Parque Nacional Natural Paramillo (COL69), Parque Nacional Río Abiseo and buffer área (PER114), Yungas Inferiores de Carrasco (BOL34) and Yungas Inferiores de Madidi (BOL36). The KBAs with the highest carbon storage rankings are found mainly in northern Colombia and Ecuador and on the Andes' eastern slopes in Ecuador, Peru and Bolivia (Figure 5.11). For more details on the methodology for calculating carbon storage in the Tropical Andes, refer to Appendix 5.7.

Table 5.13. Estimated Carbon Storage in KBAs in the Tropical Andes Hotspot

Country	No. KBA	Area of KBAs	Average Carbon Stored in KBAs (tC/ha^{-1})	Total Carbon Stored in KBAs (tC)	Percentage of Total Carbon Stored in the hotspot KBAs
Argentina	76	4,302,130	48	208,339,867	3
Bolivia	47	6,777,212	158	1,069,293,726	15
Chile	12	586,998	4	2,609,487	0.04
Colombia	119	7,878,654	169	1,328,189,869	18
Ecuador	88	4,708,664	180	845,395,490	12
Peru	106	14,393,717	233	3,358,483,639	46
Venezuela	26	4,349,607	122	532,394,696	7
Total	**474**	**42,996,982**	**171**	**7,344,706,774**	**100**

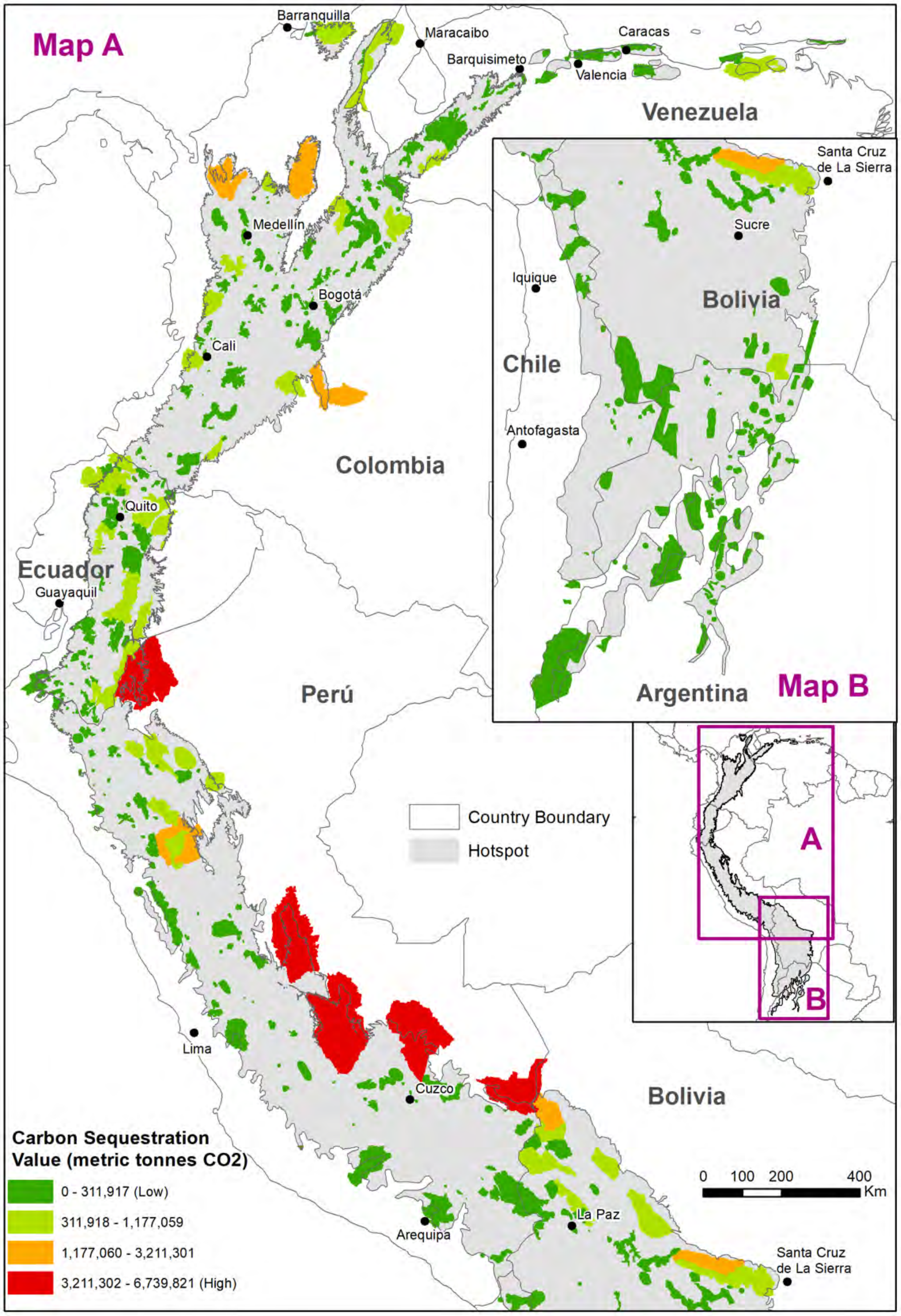
Source: Avitabile *et al*. 2016.

Table 5.14. KBA Rating for Importance for Carbon Sequestration in the Tropical Andes Hotspot. Number of KBAs

País	No. KBA				
	Very high	High	Medium	Low	Total
Argentina	-	-	-	76	76
Bolivia	-	2	10	35	47
Chile	-	-	-	12	12
Colombia	-	3	9	107	119
Ecuador	-	-	11	77	88
Peru	5	1	6	94	106
Venezuela	-	-	5	21	26
Total	**5**	**6**	**41**	**422**	**474**

Source: Avitabile *et al.* 2016.
Carbon Storage Classification (tC):
Very high: 3,211,301 - 6,739,821
High: 1,177,059 – 3,211,301
Medium: 311,917 – 1,177,059
Low: 0 – 311,917

Figure 5.11. Estimated Carbon Sequestration in KBAs in the Tropical Andes Hotspot



5.6 Corridor Outcomes

The Tropical Andes consists of mountain ranges running north to south, more or less parallel and separated by valleys that have been largely transformed into urban and agricultural landscapes. This geography limits the delineation of corridors, mainly to areas along the mountain ranges. Additionally, at the local level the relative biodiversity values (RBVs, Figure 5.7) demonstrate an important relationship with the elevation gradient in the Andes, with the highest values on the mountain ranges. Likewise, KBAs in the Andes are located on both the eastern and western slopes of the Andes. Within this natural biogeographic constraint, corridor outcomes were defined to meet 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.

The 2015 CEPF ecosystem profile identified several corridors spanning a wide range of climate regimes that provide more opportunities at the regional scale for species to track suitable climates as they move across the landscape. However, based on the recommendations of experts who contributed related information on species, ecosystems, and the shared socio-political context of these landscapes, the profile update includes certain modifications to the corridors that allow for coherent and coordinated deployment of conservation strategies.

This analysis resulted in a total of 28 corridors in the hotspot, including nine corridors shared between two or three countries and corresponding to an area of 52.2 million hectares or 33 percent of the hotspot (Table 5.15, Figure 5.12). Of the 474 KBAs in the hotspot, 299 KBAs fall within a corridor. The vast majority of the highest RBV KBAs for each country are also included within corridors. The delineated corridors include around 10 KBAs on average, with the La Victoria-La Cocha-Sibundoy Corridor in Colombia having the lowest number, with three KBAs, and the bi-national corridor between Argentina and Bolivia, Tarija-Jujuy, encompassing the highest number, with 27 KBAs (Table 5.16). The corridors also show a wide variation in the percentage of their area under protection. Across the hotspot, the average area under protection within the corridors is 53 percent (Table 5.16), but the range goes from 17 percent in the Peruvian Tierras Altas of the Lima-Junín Corridor to 98 percent in the Colombian Cordillera Central Corridor and the Ecuadorian Western Azuay Corridor.

Table 5.15. Summary of Corridor Outcomes for the Tropical Andes Hotspot

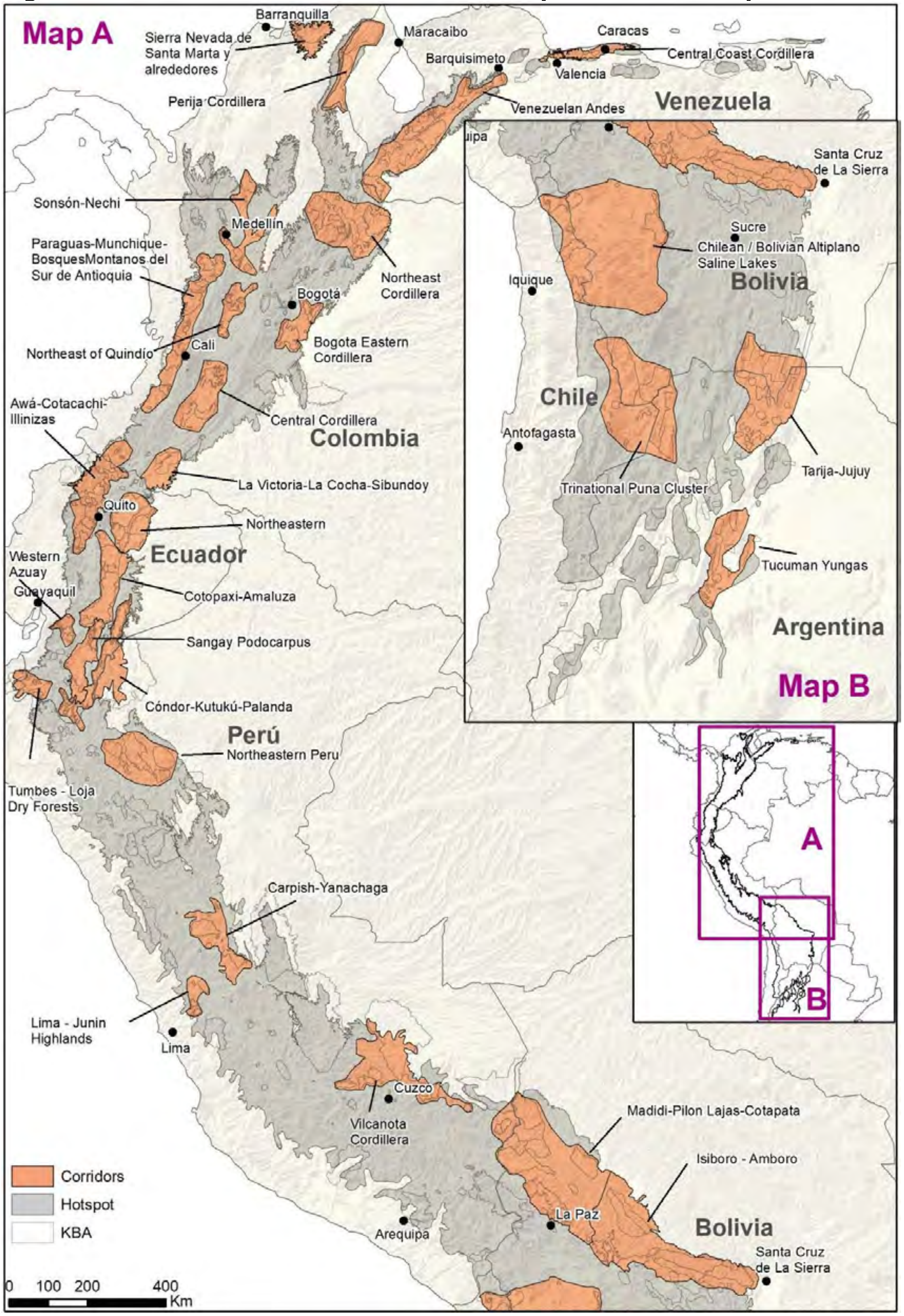
Country	Number of corridors (shared with another country)	Tropical Andes Hotspot area (ha)	Area of corridors (ha)	Percentage of the hotspot covered by corridors
Argentina	3 (2)	14,872,835	3,800,126	26
Bolivia	5 (4)	37,000,978	16,843,918	46
Chile	2 (2)	7,384,220	2,705,397	37
Colombia	11 (3)	35,028,997	11,250,508	32
Ecuador	7 (3)	11,786,708	6,803,414	58
Peru	7 (3)	45,326,966	6,551,962	14
Venezuela	3 (2)	6,952,395	4,204,389	60
Hotspot Andes Tropicales	**28 (9)**	**158,353,100**	**52,159,713**	**33**

Table 5.16. Characteristics of Corridors in the Tropical Andes Hotspot

Corridor name	Country	No. of KBAs	Total area (hectares)	Percentage of protected area
Venezuelan Andes	Venezuela/Colombia	13	3,419,306	39
Tumbes-Loja Dry Forests	Ecuador/Peru	14	475,808	97
Carpish-Yanachaga	Peru	8	1,162,784	36
Cóndor-Kutukú-Palanda	Ecuador/Peru	11	1,688,275	40
Central Cordillera	Colombia	7	1,480,392	98
Central Coast Cordillera	Venezuela	6	544,494	55
Perijá Cordillera	Venezuela/Colombia	4	1,414,593	42
Vilcanota Cordillera	Peru	10	2,186,306	43
Bogota Eastern Cordillera	Colombia	4	871,998	45
Awá-Cotacachi-Illinizas	Ecuador/Colombia	24	2,039,201	53
Cotopaxi-Amaluza	Ecuador	7	1,362,858	64
Isiboro-Amboró	Bolivia	13	4,271,376	52
La Victoria-La Cocha-Sibundoy	Colombia	3	728,547	26
Chilean/Bolivian Altiplano Saline Lakes	Bolivia/Chile	9	6,780,807	22
Madidi-Pilón Lajas-Cotapata	Bolivia/Peru	18	5,055,482	44
Northeastern Peru	Peru	6	1,811,338	24
Northeast ofQuindío	Colombia	15	643,853	72
Northeast Cordillera	Colombia	12	2,891,170	44
Northeastern	Ecuador	5	1,290,706	94
Watern Azuay	Ecuador	6	283,388	98
Paraguas-Munchique-Bosques Montanos del Sur de Antioquia	Colombia	15	2,068,599	63
Sangay Podocarpus	Ecuador	11	927,212	56
Trinacional Puna	Chile/Argentina/Boli via	6	3,723,424	52
Sierra Nevada de Santa Marta y alrededores	Colombia	5	772,168	70
Sonsón-Nechi	Colombia	12	1,293,218	25
Tarija-Jujuy	Argentina/Bolivia	27	2,844,423	60
Lima-Junin Highlands	Peru	5	337,040	17
Tucuman Yungas	Argentina	17	1,340,333	18

The identification of corridors that maintain north-south connectivity along the Andean cordilleras, and the location of KBAs in these cordilleras, support conservation of the habitat for threatened species with wide latitudinal distributions (<130,000 km2) along the mountain ranges. These species include mammals such as the spectacled bear (*Tremarctos ornatus*, VU), the mountain tapir (*Tapirus pinchaque*, EN), the brown spider monkey (*Ateles hybridus*, CR) and the Andean mountain cat (*Leopardus jacobita*, EN); as well as bird species such as the yellow-eared parrot (*Ognorhynchus icterotis*, EN) and the black-and-chestnut eagle (*Spizaetus isidori*, EN). Similarly, the delimitation of corridors that group KBAs with similar habitats and species provides areas with natural habitat cover and sufficient altitudinal gradients that facilitate the exchange of individuals between populations and allow altitudinal movement in response to climate change. This improves the species' chances of survival and maintaining their genetic diversity.

Figure 5.12. Corridors Identified for the Tropical Andes Hotspot



6 THREATS TO BIODIVERSITY IN THE HOTSPOT

6.1 Introduction

The Tropical Andes Hotspot is considered the most important in the world in terms of biological richness, but its long history of human occupation has caused a profound transformation from natural to anthropogenic landscapes. According to World Bank data, between 1960 and 2015, the countries that are part of the hotspot have doubled their population, which in many cases is concentrated in the Andean region. This is the main reason why the region today faces intense pressures that create environmental and social impacts (Llambí *et al.* 2019; Correa-Ayram *et al.* 2020).

In addition to the increasing concentration of people, there is a growing road infrastructure that provides permanent access to agricultural storage centers, processing plants, local and regional markets and airports. As a result, the fertile agricultural soils of the Ecuadorian, Colombian and northern Peruvian Andes are covered by pastures for dairy cattle and agricultural crops. Crops include those grown for domestic and commercial consumption (e.g., potatoes and other tubers, wheat, barley, corn, legumes and fruits), and for export (e.g., broccoli, artichoke, quinoa, avocado, cut flowers, coffee and cacao). The natural vegetation of the inter-Andean valleys, slopes and adjacent high plateaus has been lost, as has been the associated richness and biodiversity, especially in the northern Andes (Corrales 2001, Wassenar *et al*. 2007, Rodríguez E. *et al*. 2012, in CEPF 2015). However, many of these transformations are difficult to quantify (Buytaert *et al*. 2006; Tognelli *et al.* 2016).

To protect these natural Andean landscapes, which include KBAs and corridors, one of the most effective strategies proposed in the 2015 ecosystem profile, and which is still being pursued, is the establishment of protected areas and the definition of conservation corridors (Olson 2010; Tognelli *et al.* 2016; CEPF 2015). Protected areas are useful because they help maintain the largest possible expanses of forests and native vegetation under a legal conservation regime. In addition, they protect other important natural vegetation types, associated ecosystem services and biodiversity. In the case of corridors, they allow for macro planning based on connectivity between ecosystems. There is, however, still much to be done in the hotspot; only 27 percent of the ecoregions of Bolivia, Colombia, Ecuador, Peru and Venezuela are protected and barely 17 percent are connected (Castillo *et al.* 2020). Section 5.4 discusses the legal protection status of KBAs in greater depth.

The national consultation workshops analyzed 118 Tropical Andes KBAs with important biodiversity values, all of which are under some level of threat, regardless of their degree of protection. This phenomenon is due to a combination of impacts, which include (1) mining, (2) deforestation (which is often a direct result of the other threats), (3) advancement of the agricultural frontier, (4) changes in human demographics, which includes the illegal occupation of land, and (5) hunting and trafficking of flora and fauna. (Table 6.1). Each of these threats is discussed in depth throughout this chapter and related to the affected KBAs and corridors.

In order to protect the remaining natural ecosystems and their associated services, the national governments of the Andean countries have increased their investments in conservation in recent years (see Chapter 11), although this trend may be reversed due to the COVID-19 pandemic. While still insufficient to confront the serious threats to the hotspot, these efforts have been directed at consolidating protected area management systems. These investments and efforts have included strategies for economic incentives, research, monitoring, sustainable management of productivity in the zones of influence, and environmental education. As a complement to this process, civil society has promoted the declaration of new private protection schemes, some of which are focused on KBAs and have different management schemes. For example, the Reserva Natural Meremberg (COL90) is managed by a family; the Reserva Natural El Pangán (COL86) is managed by the NGO Proaves; in the Laguna La Cocha KBA (COL50), the Asociación para el Desarrollo Campesino has been implementing conservation-production initiatives for more than 40 years; the Reserva Natural La Planada (COL88) is managed by the Awá indigenous people; La Estación Biológica Villa Carmen, managed by the Asociación para la Conservación de la Cuenca Amazónica, is within the Kosñipata-Carabaya KBA (PER44) and in Ecuador certain conservation areas are managed by municipal governments, communities and private citizens within the Maquipucuna-Río Guayllabamba (ECU43) and Los Bancos-Milpe (ECU41) KBAs.

6.2 Classification and Quantification of Threats

The cumulative index of current anthropogenic impacts, derived from the Landscape Condition Model, was used to quantify the level of threat in the hotspot and its corridors and KBAs (Comer *et al.* 2013). This model evaluates the impact of threats on ecosystem integrity, allowing the spatial representation of each threat in the hotspot. Information on eight factors was taken into account for its development: livestock, agriculture, main roads, urban areas, hydrography, mining concessions, airports, and hydrocarbon concessions for the period 2010 to 2020 (depending mainly on the availability of information in each country). For the case of Venezuela, for example, data were only found for three of the eight factors.[5]

At the hotspot level, the model shows higher levels of impact for Colombia and Ecuador, as well as in northern and central Peru, in contrast with the rest of the countries (Figure 6.1). Figure 6.1 shows that the greatest impacts are associated with the road network. The construction of roads alone implies a transformation of the territory that also catalyzes other threats such as mining, agriculture, livestock and the establishment of population centers. A comparison of these results with those of the 2015 ecosystem profile shows that the trend of converting the northern Andean valleys into areas for agricultural use, with high population levels, continues. This is the case in the valleys of Colombia and Ecuador, which are intensively used for the establishment of crops. In the Andes of Peru, Bolivia, Chile and Argentina, however, agricultural use is reduced and the concentration of human populations is lower due to the adverse climate and higher altitude (Tapia 2020).

[5] Subsequently, each factor was assigned an intensity rating at the site that reflects the degree to which the type of land use is compatible or not with biodiversity conservation. The intensity ratings of the factors were adapted from the study developed by Jarvis et al. (2009) for South America. The model results are presented using the 13 km^2 hexagon plot, thus covering the entire hotspot (shown in Figure 6.1) (this metric was also used to represent the Relative Biodiversity Value, discussed in Chapter 5). Regarding the results at the corridor and KBA level, these were represented as a function of the mean value of the hexagons intersecting the corridors and KBAs (See Figures 6.2 and 6.3). For more information see appendix 6.1.

Figure 6.1 Landscape Impacts in the Tropical Andes Hotspot

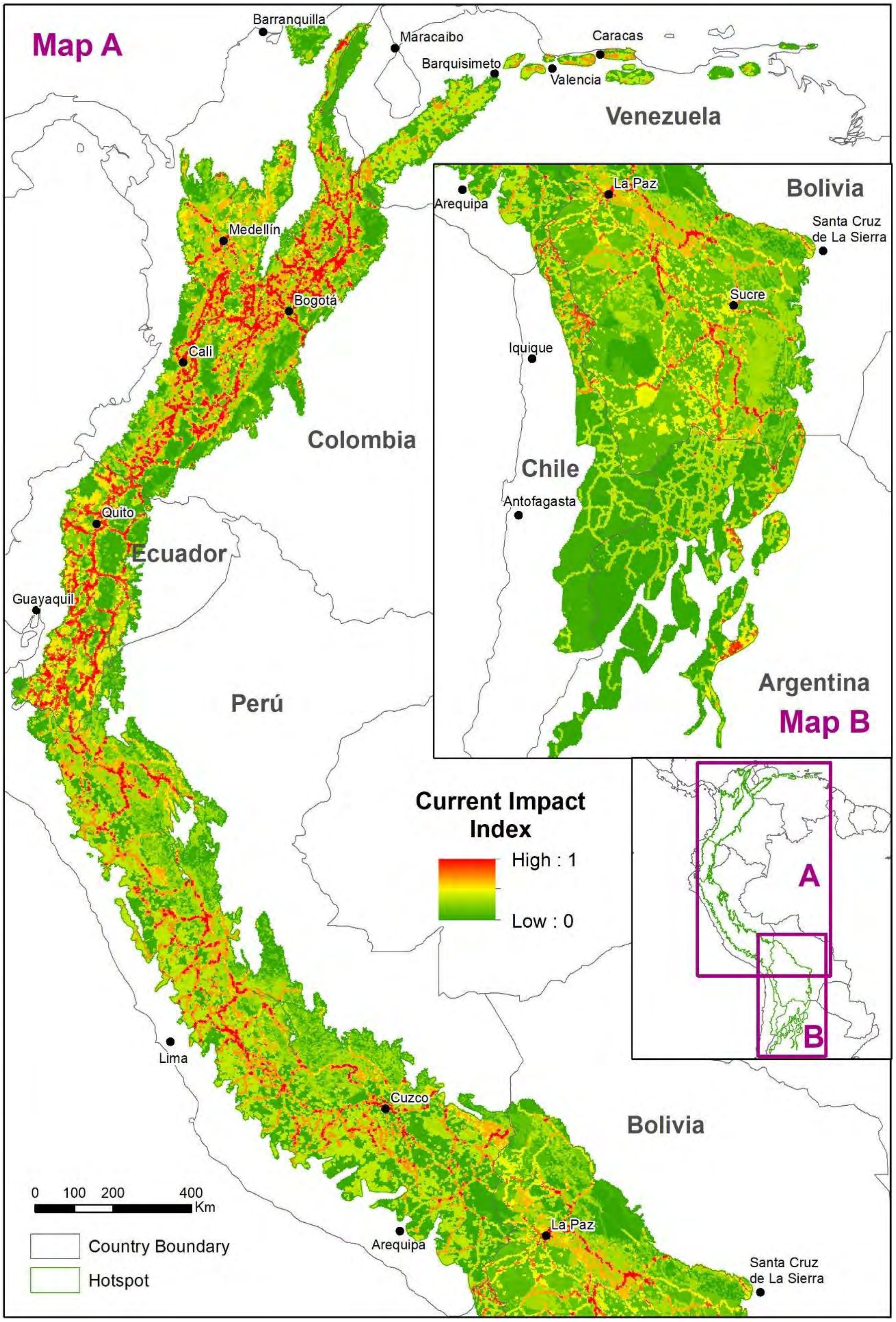


Figure 6.2 presents the threat level of the KBAs and shows a high similarity with the impact index at the hotspot level (Figure 6.1). The KBAs with the highest threat level are located in the Eastern, Central and Western Cordilleras of Colombia, in the north and south of Ecuador and in the north and center of Peru, coinciding with areas of high concentration of mining concessions, main roads, urban areas and extensive agriculture. The KBAs with the highest impact indices across the hotspot are Agua Rica (ECU4), Villavicencio (COL120), Parque Nacional Tingo Maria (PER71) and Cochabamba (BOL48). No KBA in Venezuela, Chile or Argentina has a high impact value.

In general terms, the level of threat presented in the previous ecosystem profile coincides with the current one. That is to say, the KBAs located in the Eastern, Central and Western Cordillera of Colombia, northern Ecuador, and the border area between Ecuador and Peru continue to register a higher level of threat (CEPF 2015).

Most of the KBAs have a low level of threat. This could be due to the tendency to delineate KBAs to include natural cover or protected areas. This does not mean that they are not subject to stressors, but rather that they are located in areas where current land uses and infrastructure have a relatively lower impact.

According to Figure 6.3, the level of threat in the hotspot corridors shows a high impact in the Northeast Quindío Corridor in Colombia, to the north and south of Ecuador, and to the north and center of Peru, while the other corridors show low and medium values.

The current analysis of the threat level of the corridors coincides to a large extent with that of the 2015 ecosystem profile. The Northeast Quindío Corridor continues to have at a high threat level, although the corridors located in the Eastern Cordillera moved to a medium-high level, probably due to the availability of more information from that area to inform analysis, as well as the development of nearby major cities (e.g., Bucaramanga and Bogota).

Four corridors in Ecuador, Awá-Cotacachi-Illinizas, Oeste de Azuay, Sangay-Podocarpus and Bosques Secos de Tumbes Loja, have an increased level of threat, compared to the 2015 ecosystem profile. It is highly probable that this situation is based on the proximity to cities that have grown and increased their population density in recent years.

In the case of the Peru-Ecuador border, the situation has changed slightly compared to the 2015 ecosystem profile. On the one hand, the Bosques Secos Tumbes-Loja Corridor continues to have a high level of threat. Other corridors have an increased level of threat. For example, the Northeast Peru corridor is threatened by roads and dams, and the Carpish-Yanachaga Corridor is pressured by road construction and agricultural expansion.

Figure 6.2. Threats to KBAs in the Tropical Andes Hotspot

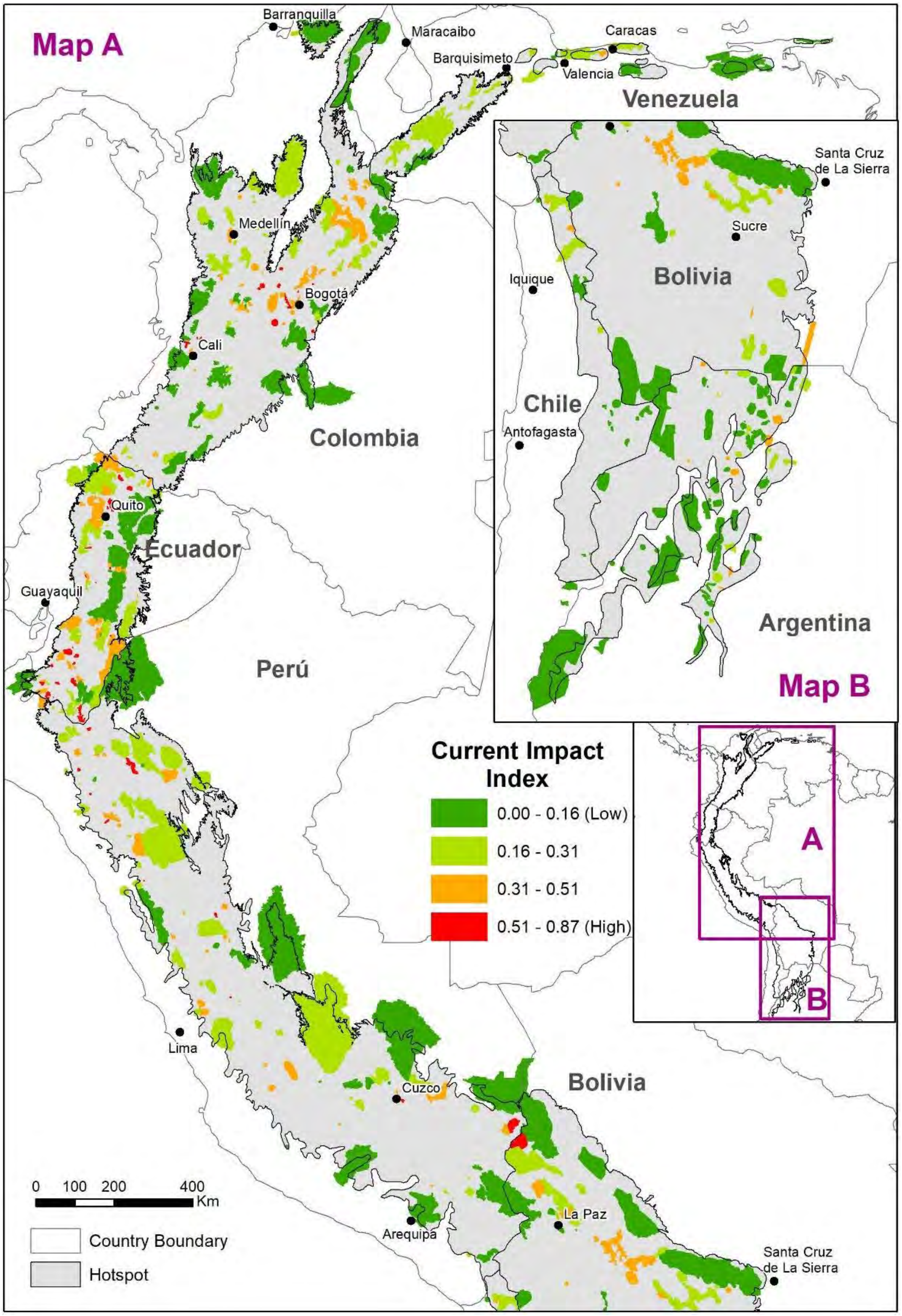
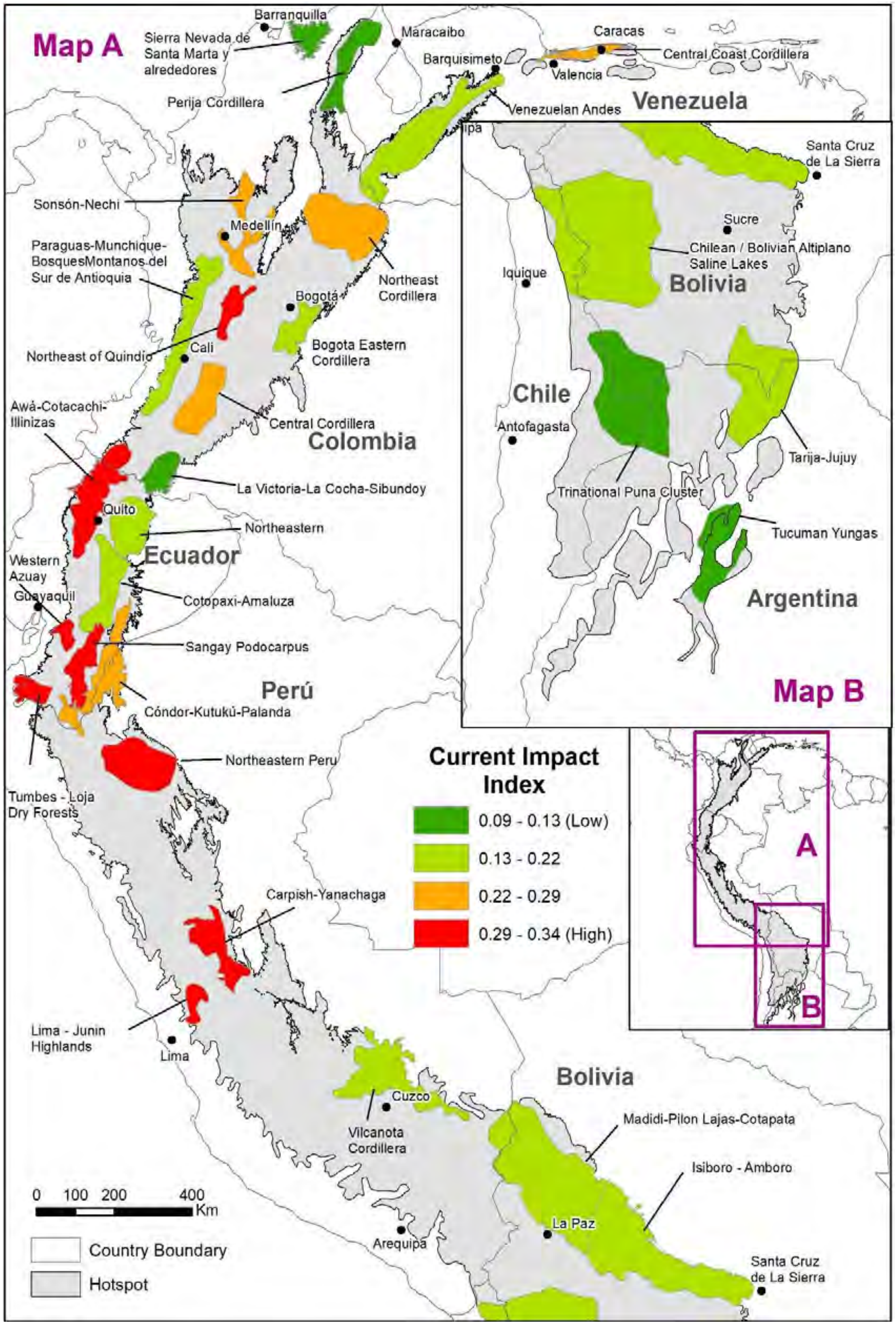


Figure 6.3. Threats to the Corridors of the Tropical Andes Hotspot



A comparison of Figures 6.2 and 6.3 shows that the impact index value is higher in corridors than in KBAs. This is explained by the fact that the highest impact values are concentrated outside KBAs, but are located within corridors. This makes sense considering that about 63 percent of the hotspot area under KBA coverage overlaps with protected areas (see section 5.4). These areas tend to have lower levels of the impact factors considered for the development of this model. The level of impact in the corridors is now higher than that determined in the previous ecosystem profile. This may be due to two factors. First, the modelling information in the previous profile used values from the years 2000 to 2012, while in this ecosystem profile they are more recent and, the impacts have increased in the hotspot over the years. Second, the transparency laws of the hotspot countries have facilitated access to more complete information than in the past. A clear example of this is the comparison between the mining concession maps of the previous profile and the current profile. By country, the corridors with the highest impact index are: Northeast Quindío in Colombia; Awá-Cotacachi-Illinizas, West Azuay, Bosques Secos de Tumbes Loja and Sangay-Podocarpus in Ecuador and Northeast Peru, Carpish-Yanachaga and Tierras Altas de Lima-Junín in Peru.

It is important to mention that the threat values for KBAs and corridors resulting from the model do not necessarily coincide with the threat results from the prioritization of KBAs (see Chapter 13) identified by the experts in the national workshops. This is due to two factors. One, the model uses the most recent information available for the period 2010 to 2018, while the prioritization gives forward-looking threat values formulated from information provided by the experts based on their updated knowledge of the area. Two, the model, and the resulting maps shown in this chapter, were prepared with quantitative data, while the opinions expressed by the experts in the workshops are based on perception; therefore, qualitative values were used for the prioritization.

6.3 Frequency of Threats in KBAs and Corridors

To determine the prevalence of threats in the hotspot, 146 surveys were conducted with experts representing NGOs, indigenous organizations, public officials and researchers from the seven hotspot countries. The results were evaluated in relation to the severity and the frequency of occurrence of threats. The prevalence of threats in the KBAs and corridors was thus estimated (Table 6.1).

Table 6.1 Update of the Prevalence of Threats in KBAs and Corridors by Country according to the Opinion of 146 Experts

Threat category	Argentina	Bolivia	Chile	Colombia	Ecuador	Peru	Venezuela	Relative importance of threats
Climate change								22
Mining								22
Deforestation								21
Agricultural encroachment								21

Illegal occupancy and insecure land rights								20
Hunting and wildlife trafficking								20
Illegal logging								20
Colonization								19
Infrastructure (roads and dams)								19
Livestock grazing								19
Urban expansion								18
Illegal crops								17
Insecurity and violence								17
Industrial agriculture								16
Firewood collection								15
Unorganized or expanding tourism								15

Source: National Consultation Surveys, 2020. *Purple is of very high importance; red is of high importance; orange is of medium importance; and yellow is of low importance.

Local experts surveyed perceived the most important threats to the KBAs and corridors across the hotspot to be climate change, mining, deforestation, agricultural encroachment, illegal land occupation and migration, hunting, trafficking of flora or fauna, and illegal logging. Medium-impact threats were illegal crops (coca, poppy, etc.), insecurity or violence, industrial agriculture, firewood collection and disorganized tourism. The differences in the sum of threats between countries are small.

When compared to the 2015 results, the threats identified as the most important were mining, new infrastructure (roads), agriculture (including subsistence and commercial but not industrial agriculture), grazing and deforestation (CEPF 2015). The minor threats cited in the previous ecosystem profile were hunting, illegal trafficking of flora and fauna, illegal logging, firewood collection and industrial agriculture. There is a slight change in the experts' perception of threats in the last five years, especially in relation to climate change, hunting and illegal trafficking of flora and fauna. These are considered major threats in the hotspot in the present ecosystem profile, but not in the previous one.

Another initiative related to identifying environmental problems in the hotspot is the study carried out by the Universidad Andina Simón Bolívar (Ecuador headquarters), based on the perception of those attending the regional course "Management of Conservation Projects" (sponsored by CEPF). Under this study, environmental problems in the hotspot were grouped under 15 themes, the most important of which were: deforestation (15.5 percent), expansion of the agricultural frontier (14.04 percent), mining (12.87 percent) and loss of water sources

(9.94 percent) (BYOS and UASB 2020). These results coincide, to some extent, with those presented in this document.

6.4 Assessment of the Main Threats in the Hotspot

This section analyzes in detail the main threats to the hotspot, based on the results shown in Table 6.1.

Deforestation

During the years 2001 to 2019, hotspot countries lost 24.1 million hectares of forest cover at the national level. Argentina had the highest deforestation rate (314,000 hectares per year), the same as between 2001 and 2012 (CEPF 2015). The country with the second highest deforestation rate was Bolivia, with 300,000 hectares per year, followed by Colombia, which lost 229,150 hectares per year (Table 6.2).

Each country in the Andean region used different methods to obtain data on forest cover loss and deforestation rates. Therefore, when looking at the figures below, it should be understood that the estimations of the rate of forest cover change were done at different scales: some at the national level and others at the sub-national level.

Table 6.2. Forest Cover and Annual Deforestation Rates in Hotspot Countries 2001 to 2019

Indicator	Argentina	Bolivia	Chile	Colombia	Ecuador	Peru	Venezuela	Total
Area of the country (million hectares) *	278	108.3	75.7	113.6	25.6	129.2	91.2	821.6
Forest cover as of 2001 (million hectares)*1	40.1	65	19.5	82.4	19.1	78.2	57.1	361.4
Forest cover by 2019 (million hectares)*1	34.1	59.3	17.5	78.1	18.3	75.1	55	337.4
Forest loss (2001 2019) million hectares in the country*	5.9	5.7	2	4.4	0.8	3.1	2.1	24
Annual deforestation rate 2001 - 2019 (million hectares/year) in the country*	0.31	0.3	0.1	0.23	0.04	0.16	0.11	1.25
Area of the country in the **hotspot** (million hectares)**	14.8	37	7.4	35	11.8	45.3	6.9	158.3

Forest loss (2001 - 2019) million hectares in the **hotspot****	0.26	0.6	0	1.5	0.26	1.2	0.2	3.9
National contribution to forest loss in the **hotspot**	7%	15%	0%	37%	7%	29%	5%	100%
Annual deforestation rate 2001 -2019 (hectares/year) **in the hotspot****	13,823	31,566	7.5	78,524	13,813	61,635	10.8	

Hansen/UMD/Google/USGS/NASA. 2020. Global Forest Change 2000-2019.
*The data corresponds to the whole country.
Source: https://www.globalforestwatch.org/
** Data corresponds to the hotspot area.

A recent comprehensive deforestation analysis was conducted in Ecuador. Between 1990 and 2018, the remnant of natural forests in the country decreased from 71 to 59 percent of the theoretical original area. The strongest deforestation dynamics occurred between 1990 and 2000 when the forested area was reduced to 64 percent of its total land area. In the period 2000 to 2008, the remaining forest area was further reduced to 61 percent of total land area (decreasing 5 percent of the natural forest area in 2008), and between 2008 and 2018 the remnant fell to 59 percent (with a loss of 4 percent of the natural forest area). The data reflect a downward trend in the annual deforestation rate for the period 1990 to 2018. The drivers of deforestation in Ecuador are related to various causes, including agricultural expansion (with the creation of milk collection centers near forested areas) and the construction of roads that allow the entry of settlers who bring with them practices of slash and burn agriculture (Sierra *et al.* 2020).

In Colombia, according to the Institute of Hydrology, Meteorology and Environmental Studies (IDEAM by its acronym in Spanish), deforestation went from 178,597 hectares in 2016, to 219,973 hectares in 2017 on a national scale. The following year, the trend was reversed as 2018 saw a 23.5 percent reduction in deforested area in the country (8,656 hectares less than in 2017). In 2019, forest loss was 158,894 hectares, or 38,265 hectares less than in 2018. In 2017, the Andean region, which in this case does not include the Sierra Nevada de Santa Marta, was the second region in Colombia with the largest deforested area, making up 17 percent of the total. In 2018, the Andean region accounted for 14 percent of the area deforested in the county; this rose to 16 percent in 2019. The main driver of forest loss in Colombia, according to the IDEAM, is encroachment and land grabbing to convert the forest to pasture without an associated productive activity. This is done for the purpose of justifying land tenure, illegal logging, extensive cattle ranching, road infrastructure, and illicit crops (Mateus 2019).

In Peru, the Ministry of Environment (MINAM by its acronym in Spanish) reports that between 2000 and 2014, the national average annual forest loss was 118,081 hectares. In parallel, the Amazon Andes Monitoring Project (MAAP by its acronym in Spanish), which includes the Amazonian slope of the Peruvian Andes, recorded the highest average annual deforestation in the Amazon between 2009 and 2016. (In 2014, some 177,566 hectares were deforested, and 164,662 hectares were lost in 2016). In 2017, there was a change in trend, which, according to the Ministry of Environment, reached a lower value that year (155,914 hectares deforested per year). The main drivers of deforestation in Peru are gold mining, agriculture (cacao), cattle ranching, illegal logging and dam construction.

In Bolivia, according to the Sustainable Development Solutions Network, annual national deforestation for the entire nation, including in the Amazon, increased on average from around 150,000 hectares per year during the 1990s to almost 300,000 hectares per year during the period 2016 to 2018. According to the Forest and Land Authority (ABT by its acronym in Spanish), between 1998 and 2018, 1,518,669 hectares were legally cleared because several laws enacted in recent years in Bolivia encourage deforestation. These include Law 741 (2015) that authorizes the clearing of 5 to 20 hectares without further formalities; Law 337 (2013) that supports food production and forest restitution; Law 1098 (2017) that favors biofuels; and Law 1171 (2019) that authorizes burning for agricultural and livestock activities. In addition to these regulations, there is the Supreme Decree 26075, amended in 2019, for the expansion of production frontiers of the livestock and agro-industrial sector into forest areas.

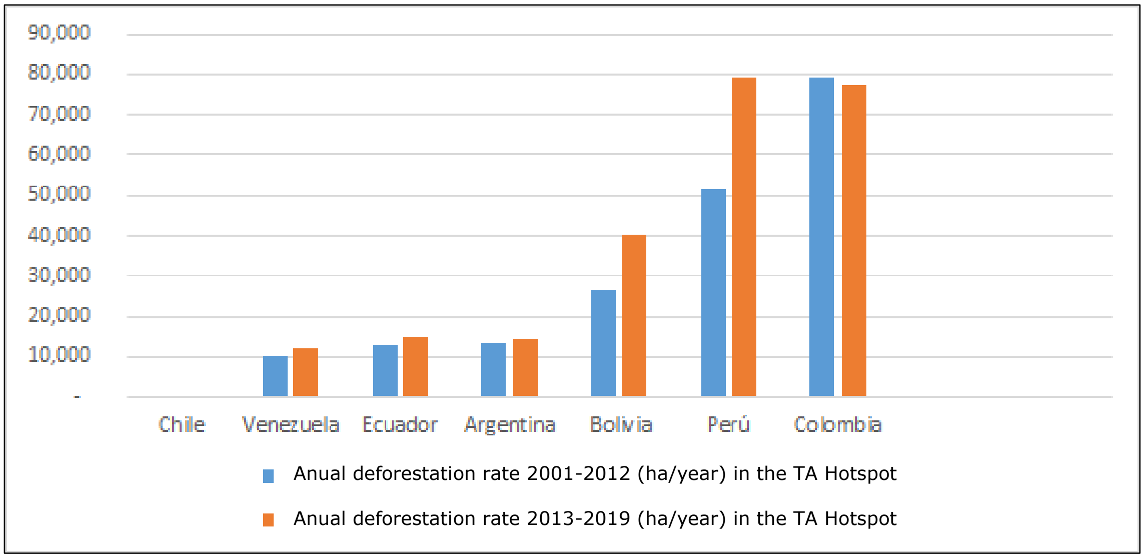
Deforestation in the hotspot and its KBAs

Between 2001 and 2019, 3.9 million hectares of forest were lost in the hotspot (GFW 2020). Colombia is the largest contributor to total deforestation in the hotspot (37 percent; 78,524 hectares per year), followed by Peru (29 percent; 61,635 hectares per year) and Bolivia (15 percent; 31,566 hectares per year). These deforestation rates are not related to the area that each country has within the hotspot, which is led by Peru, Bolivia and Colombia (Table 6.2). In terms of trends (see Figure 6.4), a comparison between the 2001 to 2012 and 2013 to 2019 periods shows that deforestation in the hotspot has tended to increase in most countries.

To determine which KBAs are most affected by deforestation, the layer of KBA boundaries was superimposed with the information on the total deforestation rate obtained to prepare Table 6.2. However, only the period from 2010 to 2019 was taken into account, given the availability of information on deforestation and agriculture across the seven hotspot countries for this period (see the discussion below on agricultural expansion). The KBA with the highest deforestation in the hotspot was Lotes 32 and 33, Maíz Gordo (ARG23) which reached 22.48 percent, followed by San Sebastián (COL97) with 17.38 percent and Moyobamba (PER65) with 15.66 percent. In absolute terms, the KBA that lost the most forest area, 61,211 hectares, was Serranía de San Lucas (COL108), a critical area for the connectivity of jaguar populations between Central and South America.

In relation to the other countries, Peru shows a drastic increase in the rate of deforestation in the hotspot: during the period 2001 to 2012, its deforestation rate was 51,406 hectares per year and this increased to 79,173 hectares per year for the period 2013 to 2019 (see Figure 6.4). The most affected KBAs in percentage terms are Moyobamba (PER65) and La Granja (PER106), as they include more than 15 percent of deforested area. In absolute terms, the KBA that lost the most forest area (46,720 hectares) was Cordillera Vilcabamba (PER33). MINAM indicates that one of the main causes of deforestation is migratory and unregulated agriculture, which is also the leading source of greenhouse gas (GHG) emissions in Peru (El Comercio 2020).

Figure 6.4. Comparative Annual Deforestation Trends in the Hotspot, 2001 to 2012 and 2013 to 2019



Source: Global Forest Watch 2020

Colombia has high deforestation rates in both periods analyzed, although when the two periods are compared it is the only country that has slightly decreased its rate (Figure 6.4). A recent study assessing the impact of deforestation on Colombia's protected areas found that 31 of the 39 protected areas (79 percent) experienced an increase in deforestation in the years following the signing of the peace agreement between the government and the Revolutionary Armed Forces of Colombia - People's Army (FARC-EP by its acronym in Spanish) guerrillas in 2016 (Clerici *et al.* 2020). This same study showed that there was a high impact due to deforestation in the area of influence of the KBA Parque Nacional Natural Sierra Nevada de Santa Marta and surroundings (COL110), and a medium-high impact in the area of influence of the KBA Parque Nacional Natural Tatamá (COL74) and Parque Nacional Natural Las Orquídeas (COL66). Another affected corridor is the Central Cordillera, where the KBA Parque Nacional Natural Nevado del Huila (COL68) experienced medium-high deforestation pressure in its zone of influence. While in the south of the country, the KBA Parque Nacional Natural Munchique y Extensión Sur (COL67) and Serranía de los Churumbelos (COL105) have a medium high deforestation impact (Clerici *et al.* 2020). The present analysis indicates that the KBAs with the highest percentages of deforested area in Colombia are San Sebastián (COL97), 17.4 percent and Reserva Natural Laguna de Sonso (COL89), 13.6 percent. In absolute terms, in addition to the aforementioned Serranía de San Lucas (COL108), which is affected by mining, illicit crops and the expansion of the agricultural frontier, the Reserva Regional Bajo Cauca Nechí (COL94) stands out, suffering one of the highest concentrations of illegal gold mining in the country and loss of 15,142 hectares of forest.

In Bolivia, the KBAs most affected by deforestation are the Yungas Inferiores de Carrasco (BOL34) and Yungas Inferiores de Amboró (BOL33) KBAs. Both are located in the Isiboro-Amboró Corridor and exceed 20,000 hectares; 6.1 percent and 4.9 percent of their surface area is deforested, respectively.

In Ecuador, although deforestation rates in recent years were not as high as in neighboring countries, many KBAs, especially those without legal protection, suffered deforestation pressures. This is the case of some KBAs in the Awá-Cotacachi-Illinizas Corridor, especially along the route from Quito to the canton of Puerto Quito in the western foothills of the Andes. According to Sierra et al. during the period 2016 to 2018, 17 percent of the net loss of national natural forest area occurred in the cordilleras and valleys of northwestern Ecuador (2020). The KBAs with the largest deforested area, more than 6 percent, are Zumba-Chito (ECU79) and Utuana-Bosque de Hanne (ECU73). In absolute terms, Reserva Ecológica Los Illinizas y Alrededores (ECU42) and Intag-Toisán (ECU34) have lost 4,392 and 2,597 hectares of forest, respectively.

According to the previous ecosystem profile, the most important strategy for preventing deforestation is the establishment of protected areas under a legal regime. However, in recent years there has been systematic weakness in their management in some countries of the region, which is due to multiple complex causes. These causes include lack of funding and personnel, poor technical and operational assistance, and centralization, among the main ones (Clerici 2020). For this reason, CEPF focused on supporting the declaration or expansion of new protected areas and strengthening their management.

The second most important strategy is focusing attention on eliminating commercial incentives that indirectly threaten forests and biodiversity, recognizing that a large part of deforestation is caused by agriculture. For the most part, this is not considered within each state, and their competent authorities follow different paths (e.g., the Ministries of Mines and Energy grant mining rights without coordinating with the Ministries of Environment).
Third, the expansion of transport infrastructure without adequate planning and control of environmental impacts can generate economic losses rather than benefits, and in other cases, land policies favor illegal tenure and trafficking as in Colombia (Vilela *et al.* 2020). This could mean a very large source of deforestation in the coming years.

For the above reasons, CEPF will promote, among other measures, productive alternatives that reduce pressures on KBAs, promote alliances between civil society organizations and levels of government, promote the integration of safeguards in projects that impact KBAs, and disseminate the importance of KBAs among national and subnational public agencies (see Section 13.2, Strategic Directions and Investment Priorities).

Agricultural Expansion

The millennia-long human occupation of the Andes mountain range has significantly influenced its conservation status (Dantas *et al*. 2014). Of the total land under cultivation in the hotspot countries, 17 percent is located in the Andes, especially in northern Peru, Colombia and Ecuador (Devenish *et al.* 2012). This is why agriculture is an important pillar of local and national economies in the Andean region (Borsdorf *et al*. 2015). Crops cover 9.5 million hectares in the hotspot, which is equivalent to 80 percent of the arable land in the Andean region (Malaga *et. al* 2019). In the hotspot, most farmers are peasants or small and medium-scale producers who farm in valleys and on hillsides, generally using traditional or subsistence methods. As the population increases in the urban centers of the rural areas, or as external demand for a particular product (such as corn) increases, so does the need to produce. This situation demands an intensification of production with modern tools, new varieties, more agrochemicals and more land. As a result, peasant farming in the Andes places pressure on the few remnants of forests and páramos in the Andean foothills. In 2017, agriculture contributed 7.6 percent of the Andean countries' GDP (above the average for all of Latin America, which was 7 percent) (see Chapter 7).

Although the agricultural sector is very important in Andean countries, but it is also one of the sectors that causes the most impacts. The change in land use from forest to crops critically affects many ecosystem services that, at the same time, benefit a large percentage of the population in rural and urban centers (*Market et al.* 2019). Thus, the provision of water and nutrients in soils decreases, the degradation of pastures for domestic livestock is accelerated, and the loss of carbon accumulation capacity in soils is promoted (Duchicela *et al.* 2019; Benavides *et al.* 2013).

In Ecuador, land-use conversion from forest to agricultural land is increasing. (This is mainly occurring for subsistence-level farming rather than agro-industrial agriculture.) According to the Third National Communication on Climate Change prepared by the Ministry of Environment and Water, the Land Use, Land Use Change and Forestry (LULUCF)[6] sector ranks third in GHG emissions, with 18.17 percent, and its contribution is trending upward (MAE 2017).

In Colombia, one of the threats that increased between 1985 and 2000 was the change from forest cover to crops (3.3 percent of which were illicit) (CEPF 2015). In that period, the area of grassland decreased slightly, but it was still the dominant land use. In 2020, according to the National Agricultural Survey (ENA by its acronym in Spanish), livestock use was 77.9 percent, and agricultural use was 9.2 percent. Columbia's Third National Communication on Climate Change estimated that the LULUCF sector was responsible for about 23 percent of greenhouse gas emissions, slightly more than in Ecuador. In Colombia, a significant percentage of the forest is also cleared to create pastures and plant subsistence and cash crops.

In Peru, the National Institute of Statistics and Informatics, through the National Agrarian Survey (2017), indicated that 12.4 percent of the country's surface area is dedicated to agricultural activity. In this country, as happens in many others in the region, this activity has an important influence on land-use change as it often begins with the cutting and burning of forests to establish subsistence crops. When soil fertility decreases, farmers or settlers tend to move to another site, thus replicating the same process in other parts of the Andes.

According to the Third National Communication on Climate Change, the main source of GHG emissions in Peru was the LULUCF sector (51 percent). The departments of Puno, Cajamarca and San Martin, all within the hotspot, registered the largest agricultural land area (3,564,000 hectares, 1,330,000 hectares and 1,292,000 hectares, respectively) in this sector. In the last two departments, there are four important KBAs for Peru: Cordillera de Colán (PER28), Río Utcubamba (PER84), Abra Pardo de Miguel (PER6) and Moyobamba (PER65).

In Bolivia, the deforestation trend in the Tropical Andes is due to the expansion of livestock grazing and small-scale agriculture, with growth primarily related to the proximity of local markets (FAN 2012). By 2020, the area dedicated to crops continued to increase, and according to the National Statistics Institute (INE by its acronym in Spanish), in the last four years, the agriculture and livestock sector has contributed more to domestic GDP (12 percent) than hydrocarbons, mining and manufacturing, employing close to 2 million workers, which positions it as the sector that generates the most jobs.

Agricultural expansion in the hotspot and its KBAs

As with deforestation, the degree of threat that agriculture poses to individual KBAs was analyzed. At the hotspot level, the most affected KBA (95.6 percent) is Agua Rica (ECU4),

---

[6] The LULUCF sector includes emissions and removals from activities that generate changes in land use, including emissions from the conversion of forests to other uses such as agriculture, pastures, human settlements, and other uses.

while 167 KBAs are not affected by this threat. In absolute terms, the 62,066-hectare Bosques Secos del Valle del Río Chicamocha KBA (COL12) was the most affected.

At the country level, Ecuador is the country with the highest percentage of KBAs affected by agricultural activity. Eight of its KBAs have had more than 75 percent of their surface area affected, including Río Caoní (ECU54) and Los Bancos Milpe (ECU41). In absolute terms, the KBA Reserva Ecológica Los Illinizas y Alrededores (ECU42) leads with 51,165 hectares affected.

In Colombia, the KBA most affected by agriculture is Pueblo Bello (COL76), with more than 90 percent of its area affected, Bosque San Antonio/Km 18 (COL7) which has been affected in 44 percent of its area and Cañón del Río Combeima (COL15), with 37.6 percent. If analyzed in absolute values, the Serranía de San Lucas (COL108) stands out again, with 32,383 hectares affected, and the aforementioned Bosques Secos del Valle del Río Chicamocha (COL12).

In Peru, Moyobamba (PER65) and San José de Lourdes (PER86) are the two most affected sites in the country, with around 30 percent of their surface area affected by agriculture, in the case of San José de Lourdes by coffee cultivation.

In Bolivia, the KBA Serranía Bella Vista (BOL29) has 95 percent of its surface area affected by agriculture, and it is also the KBA that has the largest area affected with 34,553 hectares. In general, Bolivia's KBAs have lower agricultural threat values than the rest of the countries. For example, Parque Nacional Tuni Condoriri (BOL46) and Parque Nacional y Área Natural de Manejo Integrado Cotapata (BOL45) show 7.7 and 7 percent of their total area affected, respectively. The reasons why the KBAs in Peru and Bolivia register lower agricultural threat values are the poor accessibility of these sites and the fact that some are at a considerable elevation.

In conclusion, in the Andean region, agricultural activity is an important economic activity that impacts many KBAs throughout the hotspot; this sector has been growing for several years. Although it stagnated in 2020 due to COVID-19, agriculture is expected to rebound in the coming years as many people return to the countryside because of the perception of insecurity due to the pandemic and unemployment in the cities. Therefore, it becomes important to take actions to restore Andean forest landscapes and improve agroecosystems in order to recover the ecosystem services of native vegetation and thus contribute to maintaining vital services that also benefit agriculture (Martínez *et al*. 2017). In this context, suggestions by stakeholders focused on improving sustainable land management (SLM) practices through training or experience sharing programs.

Population pressure and migration

In the last five years, demographic pressure and the effects of migration from rural areas to cities have not diminished; on the contrary, they have intensified. Thus, based on secondary information and surveys conducted in the seven Andean countries, the threat of illegal occupation of land and insecure land rights was rated as high for the hotspot (Table 6.1). However, COVID-19 has reversed this situation, and thousands of people have returned to the countryside from the cities.[7] It is too early to tell whether this situation will be reversed as the intensity of the pandemic decreases.

[7] https://www.nytimes.com/es/2020/04/30/espanol/america-latina/peru-virus-migracion-caminantes.html

In all Andean countries, there is a marked trend of rural to urban migration and, to a lesser degree, rural to rural migration (see Chapter 7). In the first case, the migration of the rural population to the cities leads to unplanned urbanization that often increases the vulnerability of some groups, for example, those who are forced to live in precarious situations on marginal lands on the outskirts of Andean cities (Roberts 2009). The indigenous population has been an important participant in rural-urban migration throughout the hotspot. Some groups have migrated from one rural highland to another or to lower land within their country, and to a lesser extent to another country (CEPF 2015) (see Chapter 7).

The migration of Andean farmers from agricultural lands to forested lands causes a significant transformation of the territory, as detailed in the previous ecosystem profile and which continues to date (CEPF 2015). In 2018, for example, this phenomenon was identified in the Andean areas of Colombia (department of Cauca, municipality of Totoró). It continues to occur, but with an aggravating factor that is not only the change in land use but the shift from traditional agriculture with crop rotation to intensive agriculture with extensive pastures, which stagnates the regeneration of native forests (Muñoz-Gómez et al. 2018).

However, not only are there migratory movements from rural to urban areas in the region, but there is also intra-regional movement (CEPF 2015; ECLAC 2017). Cities attract the rural or indigenous population as well as immigrants from other Latin American countries, many from the Andean region. Migrants from the Andean region account for about 78 percent of this movement. This increase in intraregional immigration is consistent with the international mobility processes noted in the 2018 International Organization for Migration (IOM) report, which indicates that globally, South-South migration accounts for 37 percent of global migration (See Chapter 7).

Another distinct element observed with respect to human mobility is the shift from rural-urban migration to migration between urban centers (ECLAC 2017). A final and new pattern for the 2015 to 2020 period is the intense migratory flow from Venezuela (IOM 2018). To 2019, the estimated number of migrants from that country arriving in the other Latin American countries was 3 million people, out of a total of 4.7 million people who left Venezuela that year (Abuelafia 2020) (see Chapter 7).

These migratory flows have various causes and effects. In the previous ecosystem profile, for example, it was reported that road networks and hydroelectric projects are infrastructures that promote the flow of people because they facilitate the movement and occupation of previously inaccessible areas. This is the case of the Southern Interoceanic Highway (Peru-Brazil), the first highway in South America connecting the Atlantic and Pacific oceans. The highway generated environmental impacts and facilitated migration to the state of Acre, Brazil and the department of Madre de Dios in Peru (Dourojeanni 2016), whose western section is within the hotspot.

Another important driver of migration (legal and illegal) is mining, as it encourages massive movements of people in search of employment opportunities. In Peru, for more than 10 years, there has been migration along the Southern Interoceanic Highway in Madre de Dios, as people go in search of jobs in the gold mines. This migration is not only to the mining areas but from these places to urban centers. This is because mining produces impacts where operations are established. The resulting pollution and depletion of resources prompt onward migration from territories that are no longer productive, or have little remaining productivity, to cities or other sites. (Diario El Potosí 2018). Urban-rural migration caused by the COVID-19 pandemic is addressed in the last section of this chapter.

Migration (and associated infrastructure) generates serious impacts on the environment as it motivates the use of resources and ecosystems from the landscapes surrounding the cities that receive the uncontrolled flow of people (CEPF 2015). This phenomenon also overburdens systems associated with social protection and access to basic services in cities (water, electricity and wastewater treatment). It puts pressure on local, regional and national governments that must guarantee minimum conditions for coexistence (UNESCO 2019).

Given the unavailability of spatial information on this threat, the KBAs most affected by population pressure were identified in the national workshops. They are: La Forzosa-Santa Gertrudis (COL46), Yungas Superiores de Carrasco (BOL40), Yungas Inferiores de Carrasco (BOL34), Cristal Mayu y Alrededores (BOL14), Yungas Inferiores de Pilón Lajas (BOL37), Cordillera de Colán (PER28), Abra-Patricia Alto Mayo (PER7), 6 km South of Ocabamba (PER3), Quincemil (PER75), Abra Málaga Vilcanota (PER5), Parque Nacional Tingo María (PER71), La Empalada (COL45), Alto de Pisones (COL5), Parque Natural Tatamá National (COL74), Serranía de los Paraguas (COL106), Cerro Pan de Azúcar (COL20), Selva de Florencia (COL101), Páramos y Bosques Altoandinos de Génova (COL60) and Laguna de la Cocha (COL50).

To conclude, the convergence between related international commitments, regional integration processes and national realities do not always translate into the management and care of natural resources (Stefoni 2018). Therefore, it is vital to understand the root causes and dynamics of occupation by legal and illegal human migration (especially in areas of high biodiversity and corridors) in order to design effective strategies for territorial management and develop policies that protect these landscapes, including environmental governance processes linked to the competencies of subnational governments, which are key actors in these processes.

Transportation infrastructure

In recent decades, the road network through the Tropical Andes Hotspot has expanded rapidly from the Andean side into the Amazon lowlands. Most of these road construction projects lack rigorous environmental and social impact assessments resulting in direct and indirect consequences for the conservation of the KBAs (Vilela *et al.* 2020). Table 6.1 shows that transportation infrastructure is considered one of the five major threats to the hotspot. Similarly, transportation infrastructure or main roads is considered among the variables used for the analysis of threats in the hotspot. (Figure 6.1)

As of 2015, all hotspot countries made significant investments in road and river infrastructure (particularly Bolivia, Ecuador and Peru), including paving and widening existing roads or creating new ones. As of 2017, the South American Council for Infrastructure and Planning (COSIPLAN by its acronym in Spanish) registered a total of 517 projects in hotspot countries, which have the potential to impact more than 10 corridors and dozens of KBAs (see Chapter 8).

Despite this scenario, there has been no comprehensive assessment of the negative impacts of road construction in the hotspot between 2015 and the present. A recent study by Conservation Strategy Fund focused on the Amazon region of Bolivia, Brazil, Colombia, Ecuador and Peru, identifies some of the factors that trigger environmental and economic impacts generated by the construction of this type of road infrastructure in this region. The research evaluated 75 road projects, for a total of 12,000 km of roads built mainly in the lower Amazon, which is outside the hotspot. Forty-five percent of the projects generated economic losses without considering social and environmental externalities. At the same time, a small set of projects were identified that could be generating economic benefits at the same time

(Vilela *et al.* 2020). And while these figures may have little impact on the hotspot, it is necessary to understand that planning policies on road construction in the region are the same for any type of ecosystem, and as mentioned above, social and environmental impact assessment processes are weak in all hotspot countries.

Some major roads that currently cross the Andean mountain range can facilitate the growth of secondary road infrastructure and increase impacts on KBAs. In Ecuador, this happens in the Awá-Cotacachi-Illinizas Corridor where the road to San Lorenzo, which goes from the highlands to the Ecuadorian coast, has generated negative impacts due to deforestation, especially in the KBAs of Awacachi Corridor (ECU28) and Territorio Étnico Awá y Alrededores (ECU70), specifically in the Baboso river sector. The same happens in southern Ecuador, in the Condor-Kutukú-Palanda Corridor, Ecuador-Peru border and in the Alto Nangaritza Protected Forest KBA (ECU9), which has suffered major impacts from mining, as well as the construction of 30 km of road upstream of the Nangaritza River between 2010 and 2018. There are still 40 km more to be completed; however, this last stretch would affect the connectivity between the Parque Nacional Podocarpus (ECU50) and the Reserva Biológica Cerro Plateado, which is part of the transboundary Cordillera del Cóndor KBA (ECU27).[8]

In Peru, in the Cordillera Vilcanota Corridor, some KBAs have also suffered some impact from road construction. For example, the Kosñipata-Carabaya KBA (PER44) is under pressure from the road from Cusco to Manu. The same happens with the Interoceanic South road that directly affects the Quincemil KBA (PER75), especially in the Soqtapata sector, where there is also evidence of mining.

In Bolivia, Cotapata (BOL13) has suffered from the opening of legal and illegal roads in recent years, according to information received at the national consultation workshop.

Although transportation infrastructure causes impacts on biodiversity, many infrastructure projects can provide economic benefits while decreasing environmental impacts (Vilela *et al.* 2020). For this to happen, civil society must be involved to ensure that mitigation measures are adequate and implemented. At the same time, it is important that these types of projects are planned away from biologically sensitive areas. Another option is to support surveillance to prevent damage to protected areas with road access (an activity that CEPF has supported in the Vilcabamba Amboró Corridor) (CEPF 2015).

Dams for Hydroelectric Production and Irrigation

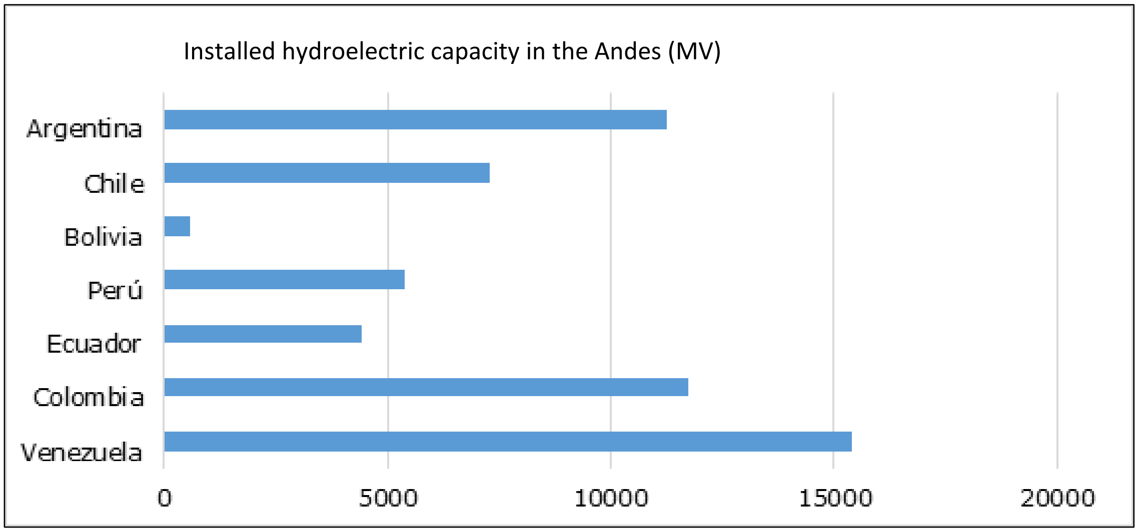
The watercourses and water bodies of the Tropical Andes provide water to more than 59.7 million people in the region and another 20 million in the lower basins. Thus, they provide hydroelectric power and water for human consumption to almost all the major Andean cities such as La Paz, El Alto, Quito, Cali, Medellín, and Bogotá, to mention just a few (Devenish and Gianella 2012). They also provide irrigation water for agriculture, especially in Colombia, Peru and Ecuador, helping to increase the production of flowers and food for export in these countries.

The demand for water for hydroelectricity has grown in the region in the last five years (see Figure 6.5), and with it, related projects: hydroelectricity accounts for more than 60 percent of the region's electricity generation, due to 37,000 MW of installed capacity (OLADE 2019). At the same time, there is large untapped potential (IHA 2018). In 2018, new power plants came

[8] https://zamora-chinchipe.gob.ec/una-obra-mas-para-el-alto-nangaritza/

into operation providing about 5 GW, estimating a growth of 2.6 to 3.7 percent per year until 2040 (Yepez-García *et al.* 2018).

Figure 6.5. **Installed Hydroelectric Capacity in the Andean Countries**



Source: International Hydropower Association, 2018.

The previous ecosystem profile defined the main impacts on connectivity between the headwaters of Andean rivers and the Amazon lowlands due to the effect of hydroelectric infrastructure in four hotspot countries. At that time, 151 dams were identified in plans (CEPF 2015), and Josse *et al*. recorded 31 dams built and 59 planned for the future (2013).

Since 2015 the effect has increased. Anderson *et al.* studied eight Andean Amazonian river basins above 500 m above sea level: Caquetá and Putumayo in Colombia; Napo in Ecuador; Marañón and Ucayali in Peru; and Madeira, subdivided into Madre de Dios, Beni and Mamoré sub-basins in Peru and Bolivia (2018). Six of the eight basins had hydroelectric dams in operation or under construction. In Ecuador, the upper Napo river basin and the Pastaza and Santiago sub-basins have hydroelectric projects on the agenda, which could affect the KBAs Parque Nacional Sumaco-Napo Galeras (ECU52) and Cordillera de Huacamayos-San Isidro-Sierra Azul (ECU25).

Similarly, the hydroelectric projects on the tributaries of the upper Ucayali (Peru) and Beni (Bolivia) have a potential impact on the KBAs Reserva Comunal El Sira (PER81) and Yungas Inferiores de Pilón Lajas (BOL37). The only watersheds that, to date, are not affected by hydroelectric dams are those of the Caquetá (Colombia-Brazil) and Putumayo (Colombia-Peru-Brazil) rivers. In total, 302 dams or hydroelectric projects were documented, which is almost twice as many as reported in the 2015 ecosystem profile. They include 142 dams in operation or under construction and 160 dams in various stages of planning.

According to Anderson *et al.* Peru has the largest number of existing and proposed dams, mostly small (<50 MW) located high in the Andes (there are also dams in the 100 to 1000 MW size range) (2018). Most of the future projects in that country are in this range, and at least six could exceed the installed generating capacity of 1,000 MW. Prior to 2011, the Peruvian government maintained interest in implementing a hydroelectric megaproject (Inambari hydroelectric plant) to generate 2,000 MW of energy. It would have affected the Parque

Nacional Bahuaja Sonene, but plans were shelved in 2019 as the project was considered unfeasible from a social and environmental point of view.[9]

In Bolivia, existing dams are small or medium-sized projects of less than 50 MW, while the proposed dams, although smaller in number, may exceed 100 MW. This is the case of the Ivirizu hydroelectric plant within the Parque Nacional Carrasco, which will come into operation in 2022 and will generate 290.2 MW of energy. This infrastructure will be in the Yungas Superiores de Carrasco KBA (BOL40), as well as the construction of a dam in Cristal Mayu y Alrededores (BOL14), where yellow-rumped antwren (*Euchrepomis sharpei*) (EN) is found. Another project with similar characteristics is the construction of the Chepete and El Bala dams, located on the Beni River, 16 kilometers from the municipality of San Buenaventura, in the north of the department of La Paz. Until 2017, it was considered a national priority for which new studies were carried out by the Italian company GEODATA. Should this work continue, it would affect areas of the Parque Nacional Madidi and the Yungas Inferiores de Pilón Lajas KBA (BOL37).

In Ecuador, operating dams generate less than 50 MW, with the exception of the oldest dams and the Coca Codo Sinclair project (~ 1,500 MW) located on the Napo River in the KBA Parque Nacional Cayambe Coca (ECU59).

Colombia is the only country without hydroelectric dams currently in operation or under construction in the Andean Amazon region; however, other Colombian Andean regions are affected. The Chingaza dam, located in the Eastern Cordillera in the Parque Nacional Natural Chingaza y alrededores KBA (COL61), takes water from the Orinoco basin and diverts it to the Magdalena river basin to provide drinking water to 80 percent of the population of Bogotá and to generate electricity. In addition, two KBAs with high biodiversity values located in the central mountain range, Embalse de Punchiná and its protection zone (COL34) and Embalse de San Lorenzo y Jaguas (COL35), both contain hydroelectric dams. In the Eastern Cordillera, the Calima reservoir is located in the Paraguas-Munchique/Bosques Montanos del Sur de Antioquia Corridor, prioritized in the previous ecosystem profile, is one of the largest in the Americas, provides water and energy to the Cauca Valley and is located in the vicinity of the Región del Alto Calima KBA (COL80).

From a landscape perspective, there are impacts related to ecosystem fragmentation, interruption of river connectivity and hydrological alterations of aquatic ecosystems, which affect the normal flow of aquatic species (Rubio *et al.* 2017). Such is the case of the tributary networks of the Marañón and Ucayali, which, by 2018, had lost 20 percent of connectivity, and thus affected migratory fish, aquatic plants and animals, riparian flora and fauna, and the alluvial plain (Anderson *et al.* 2018). In addition, the construction and operation of hydroelectric dams require the opening of roads and power transmission lines, which generates new impacts.

Considering the need for countries to develop hydroelectric projects and, at the same time, mitigate adverse impacts on biodiversity and natural resources, it is necessary to highlight the natural link that exists between water providers (as protectors of headwaters) and downstream consumers (in this case hydroelectric plants). Under this logic, today there are alternatives or financial mechanisms that can be managed in places where there are projects of this type, such as water funds (see more details in Chapters 8 and 11). An example of this is the Ivirizu project in Bolivia, where the National Service for Protected Areas (SERNAP by its acronym in Spanish) signed an agreement with the company Sinohydro to finance

---

[9] http://www.sectorelectricidad.com/489/peru-archivan-definitivamente-proyecto-de-hidroelectrica-de-inambari-2000mw/

management activities in the Parque Nacional Carrasco for 50 years, an element highlighted in the national workshop with key Bolivian stakeholders.

The trend in hydroelectric and dam construction in the Tropical Andes will continue to grow in the future, as has been the case over the last five years. Therefore, CSOs present in the KBAs and hotspot corridors highlight the importance of establishing regional water governance strategies that benefit all parties. On the one hand, companies should incorporate social and environmental safeguards and, on the other hand, the maintenance of upper watershed services should be ensured for the maintenance of the hydroelectric projects themselves.

Mining

The Andean region has abundant natural resources and a significant portion of global mining reserves. In recent years, world copper production has experienced a considerable increase, reaching 20 million tons (Mt) in 2019 (25 percent more than in 2006). Chile leads the world in copper production, although it decreased in 2019 (5.60 Mt down from 5.83 Mt in 2018), it also has significant copper reserves relative to other countries (200 Mt compared to the global total of 870 Mt). Peru is the second largest copper producer in the world, with 2.40 Mt in 2019; its reserves are estimated at 87 Mt.

Among the main factors motivating mining investments in the Andean region are the policies of openness to foreign direct investment (FDI) (Plazas 2016), as this activity contributes significantly to national GDPs, thereby promoting economies and the generation of formal and informal employment (WCS *et al.* 2020) (see Chapter 7).

Another mineral of strategic importance is gold, which is considered a safe-haven asset for investors in times of global economic crisis.[10] In March 2020, before the COVID-19 pandemic, it was trading on the London precious metals exchange[11] at US$1472.35 per ounce. This increased to an all-time high of US$2067.15 per ounce in August 2020.

Mining is one of the most important economic activities in the region and is also one of those that caused the greatest impacts. In the 2015 ecosystem profile, it was characterized as the most important threat to the hotspot, and a large number of mining concessions were recorded. Mining concessions have increased significantly, including within some KBAs and corridors (see Figures 6.5 and 6.6). Until 2020, mining in the Andes continued to increase, evidenced not only by the number of existing mining concessions but also by the expectations generated by the constant flow of information on the continuous discovery of new mining reserves in the hotspot. This aspect motivates the interest of new investors, but also of individuals in the informal and illegal sector who see mining as an opportunity to improve their economic conditions.

To determine the areas most impacted by mining, the mining concession layer was overlaid with the hotspot polygon and its KBAs. The analysis of mining concessions in the hotspot may overestimate the mining impact because not all of them are active but, at the same time, may underestimate it by not including illegal mining, as this spatial data is not available. The results indicate that 11 percent (17.2 million hectares) of the total hotspot area is under mining concessions, of which 2.2 million hectares overlap with KBAs, equivalent to 7 percent of the total area of KBAs within the hotspot. In total, 266 KBAs have some percentage of their area

[10] https://www.preciooro.com/cotizacion-oro.html

[11] Idem

overlapping with a mining concession, of which 10 KBAs are in Argentina, 33 in Bolivia, 75 in Colombia, 65 in Ecuador, 81 in Peru and two in Venezuela.

In Bolivia, 15 percent of the surface area of the Madidi-Pilón Lajas-Cotapata (MACPL) Conservation Corridor is under concession, with 292 mining operations, of which 231 are in the Área Natural de Manejo Integrado Apolobamba (IMNA), 41 operations in Parque Nacional Madidi and IMNA, 18 operations in Parque Nacional Cotapata and IMNA, and two operations in the Reserva de Biosfera and Tierra Comunitaria de Origen TCO Pilón Lajas. The MACPL corridor, in addition to being a region with high biodiversity, is one of the areas of the country with the greatest diversity of indigenous people and nations (WCS *et al.* 2020). The affected KBAs in the area are: Bosque de Polylepis de Madidi (BOL5), Bosque de Polylepis de Taquesi (BOL8), Cotapata (BOL13), Parque Nacional Tuni Condiriri (BOL46), Parque Nacional y Área Natural de Manejo Integrado Cotapata (BOL45), Yungas Inferiores de Pilón Lajas (BOL37) and Yungas Superiores de Apolombamba (BOL39).

In terms of surface area, the Bolivian KBAs most affected by mining are: Río Caballuni (BOL54) with 58.3 percent affected, Tacacoma-Quiabaya and Valle de Sorata (BOL30) with 34.2 percent, and Cerro Q'ueñwa Sandora (BOL9) with 29 percent of its surface area under mining concessions. Other KBAs affected by mining are Parque Nacional y Área Natural de Manejo Integrado Cotapata (BOL45), with 8 percent. Most KBAs have concessions on less than 10 percent of their territory, and fewer are affected between 10 and 40 percent of their territory (see Figure 6.6). During the CEPF Phase II investment, Wildlife Conservation Society worked with cooperatives on pilot projects in MACPL to apply best practices and networking to promote more environmentally friendly mining.

In Colombia's Paraguas-Munchique Corridor, which was identified as a CEPF priority in the previous ecosystem profile, the state has granted 93 mining titles to private companies (one in the Región del Alto Calima (COL80), five in Enclave Seco del Río Dagua (COL36) and five in Serranía de los Paraguas (COL106). Similarly, in this same area there are 106 new mining applications, which intersect with at least 27 KBAs prioritized by CEPF in 2015. The present analysis indicates that the KBAs in Colombia most threatened by mining concessions are Parque Natural Regional y Reserva Forestal Protectora Regional Páramo de Rabanal (COL134), 81.8 percent and Cuenca del Río Toche (COL32) with 59.4 percent. Another KBA with a high overlap (37.7 percent) with mining concessions is Cañón del Río Combeima (COL15).
In Ecuador, two large-scale mining projects located in the Cordillera del Cóndor KBA (ECU27) started in 2019. The first belongs to the Chinese company EcuaCorriente S.A., which promoted the Mirador project, with mining reserves estimated at 3.18 million tons of copper, 3.39 million ounces of gold and 27.11 million ounces of silver.[12] The second project is Fruta del Norte, of the Canadian Lunding Gold. It has mineral reserves of 4.82 million ounces of gold and 6.34 million ounces of silver.[13] A large-scale mining project that is still in the exploration stage and directly affects the KBA Bosque Protector Los Cedros (ECU14) is the Cascabel mining project in the province of Imbabura, where an unusual mineral deposit of 10.9 million tons of copper and 23 million ounces of gold has been quantified.[14]

In Ecuador, mining activity is present in the three corridors prioritized by CEPF in the previous ecosystem profile (Awá-Cotacachi, Noroeste de Pichincha and Cóndor–Kutukú–Palanda). These corridors contain 810 metallic mining concessions, equivalent to 36 percent of their surface

---

[12] https://lahora.com.ec/zamora/noticia/1102258987/el-proyecto-minero-ecsa-inicio-fase-de-produccion

[13] http://www.controlminero.gob.ec/proyecto-minero-fruta-del-norte-es-uno-de-los-mayores-yacimientos-de-oro-en-el-mundo/

[14] https://www.elcomercio.com/actualidad/reservas-oro-cobre-cascabel-ecuador.html

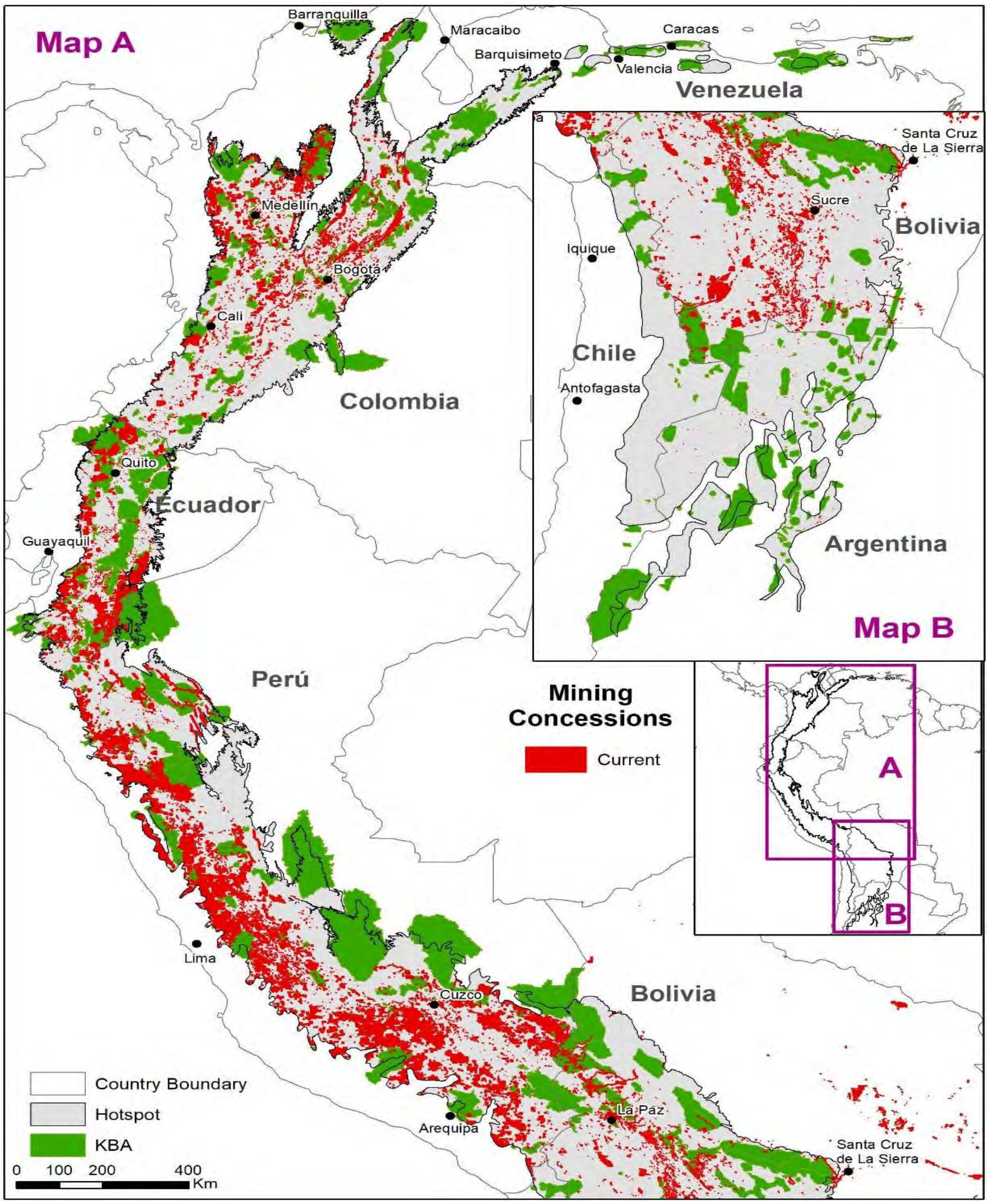
area (10,234 km^2). Sixty-seven percent of the concessions located in this area are for industrial or large-scale mining. Currently, there are 171 rights granted to 24 companies for the exploitation phase, and two projects have already begun this phase in the south of the country. Sixty-five percent of these mining concessions are in areas of high biological importance: 226 mining concessions are located in places with high numbers of endemic species and 196 mining concessions are in places with high numbers of threatened species, especially in the Reserva Ecológica Cotacachi-Cayapas (ECU61), Intág-Tosán (ECU34), Maquipucuna-Río Guayllabamba (ECU43), Territorio Étnico Awá y sus alrededores (ECU70) and the Bosque Protector Alto Nangaritza (ECU9). This area is also home to four indigenous nations, the Kichwa, Awá and Chachi to the north and the Shuar ethnic group to the south of the country (WCS *et al.* 2020). The analysis of mining impact in Figure 6.6 shows that the most affected KBAs in Ecuador are Utuana-Bosque de Hanne (ECU73) (99.9 percent), Conchay (ECU83) (85.7 percent), Cordillera de Kutukú (ECU26) (77.8 percent) and Intag-Toisán (ECU34) (73.8 percent).

Mining in Peru is made up of large mining companies as well as a large group of small-scale miners (54,449, according to the Registro Integral de Formalización Minera [REINFO]); in addition, some 150,000 people are indirectly involved. Illegal mining generates substantial illegal income in this country. It is estimated that mining production in recent years in Peru has generated more than US$1 billion annually, with illegal gold production increasing from US$84 million in 2005 to US$1040 million in 2014. The location with the highest concentration of illegal mining is La Pampa, in Madre de Dios, outside the Tropical Andes, but influencing some protected areas and KBAs very close to this area such as Quincemil (PER75) in the Vilcanota Mountains (WCS *et al.* 2020). The current analysis indicates that the most affected KBAs in Peru are the aforementioned Sihuas (PER119), La Granja (PER106), Chalhuanca (PER22) and Pampas Pucacocha and Curicocha (PER68), all of which have more than 99.9 percent of their surface area overlapping with mining concessions. Also, worth mentioning are the KBAs Río Utcubamba (PER84) and Río Araza (PER97), with 48.8 percent and 39.5 percent, respectively, of their area overlapping with mining concessions (Figure 6.6).

In the four corridors present in the Tropical Andes of Peru, there are mining concessions and illegal mining that put pressure on the KBAs. In the Condor-Kutuku-Palanda Corridor, Peruvian sector, there are 84 mining concessions (18 titled and 66 in process), which cover about 9 percent of the corridor, in addition to the illegal mining settlement Afrodita, an expansive effect caused by the Ecuadorian mining center Chinapintza located on the border. In the Northeast Corridor of Peru, 348 mining concessions have been registered (155 titled and 183 in process) representing 13 percent of the corridor. There is illegal mining is registered in the Mayo River and Utcubamba River (7 percent of the corridor), and within Cordillera de Colán KBA (PER28) and Río Utcubamba KBA (PER84) there are concessions are registered, the latter being the one with the highest concentration. In the Carpish-Yanachaga Corridor, there are 480 mining concessions (285 titled and 195 in process), representing 11 percent of the corridor, and in the Huánuco region alone there are 465 mining projects in the process of formalization. Illegal mining is present in the districts of Churubamba, Yuyapichis and Codo de Pozuzo, and within Carpish KBA (PER18) there are 128 concessions (52 titled and 76 pending), as well as illegal mining (8 percent of the KBA). In the Cordillera Vilcanota Corridor, there are 431 mining concessions (242 titled and 189 pending), equivalent to 7 percent of the corridor, as well as illegal mining in Quincemil (PER75). In the Kosñipata-Carabaya KBA (PER44), there are 16 mining concessions (only two of which are titled) and 2,234 miners are in the process of formalization. The proximity to illegal mining areas such as Huepetuhe makes this region more attractive (WCS *et al.* 2020).

As a measure to address the mining problem, the Peruvian government implemented a national mining strategy whose objective is to regularize informal mining under parameters that aim to improve the complex situation experienced in the southern Peruvian Amazon (Madre de Dios), but as a negative consequence, many illegal miners migrated to the southern Andean area of the country (Cusco and Puno), causing impacts on these sites (SERNANP 2018).

Figure 6.6. Distribution of Mining Concessions in the Tropical Andes Hotspot



Despite the fact that, in terms of numbers, mining activity seems promising, it is an activity that has had diverse social and environmental implications. The University of Arizona mapped extractive industries (mining and hydrocarbons) in the region and identified at least 226 socio-environmental conflicts in indigenous territories during the period between 2010 and 2013 (Del Popolo 2017). In Colombia alone, in 2013, out of 73 identified socio-environmental conflicts 23 were located in indigenous territories (Pérez-Rincón 2014) and, in 2017, 22 mining concessions affected 5,677,366 hectares of indigenous reserves. In Chile, the National Institute of Human Rights (INDH 2015) reported 102 conflicts, 39.2 percent of which involved indigenous territories, mainly associated with extractive mining projects of national and transnational companies and energy projects. In 2015, a total of 64 conflicts were reported by the Observatory of Mining Conflicts in Latin America (OCMAL by its acronym in Spanish) in Colombia, Ecuador, Peru and Bolivia (ECLAC 2020).

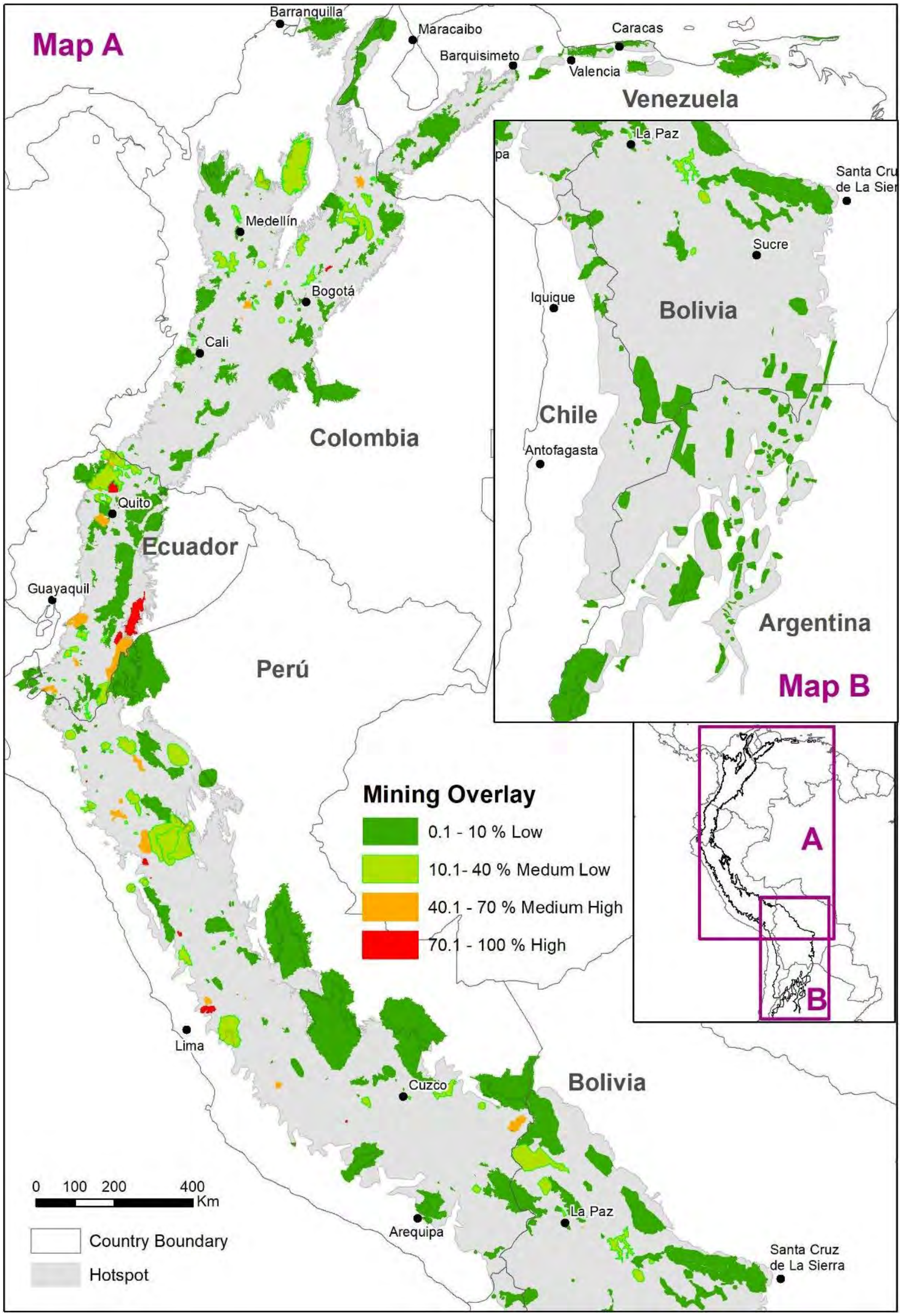
In Ecuador, the open-pit mining operation of the Mirador project generated, between 2013 and 2018, the loss of around 1,500 hectares of forest rich in biodiversity unique to the Cordillera del Cóndor (ECU27), irreversibly altering the Tundayme River due to the location of a large mining tailings deposit at that site.

In Colombia (in the Chocó bioregion) and in southern Ecuador (Nangaritza River and Parque Nacional Podocarpus (ECU50)), impacts generated by illegal mining have been recorded, especially in sensitive riparian ecosystems and protected areas, generating environmental liabilities, mercury contamination of water sources and aquifers,[15] loss of vegetation cover, among others. Added to this is the impact on ancestral cultures, which often end up being part of this illegal business, thus limiting their opportunities for dignified socioeconomic development (WCS *et al.* 2020).

In the near future, the mining threat in the hotspot will continue and will surely increase in a complex manner, especially for those KBAs that do not yet have legal protection status. Even so, as shown in Figure 6.7, most of the KBAs in the hotspot have a low overlap with mining concession titles, perhaps due to the tendency to overlap KBAs with protected areas, as mentioned above.

[15] https://www.elcomercio.com/actualidad/augusto-flores-impacto-mirador-negocios.html

Figure 6.7 Distribution of Mining Threats in the KBAs



In conclusion, mining is a general threat to the conservation of biodiversity throughout the hotspot and, therefore, enormous challenges still remain to be addressed and resolved in the face of the socio-environmental vulnerability related to this activity. These include the social and environmental impacts generated by formal and informal mining, as well as the need to invest mining revenues in the conservation and sustainability of the hotspot. To achieve this, first, it is necessary to establish effective governance mechanisms that integrate civil society in decision-making and monitoring of this activity.

Second, the formal and informal mining sector must be involved in the management of the territory, for which environmental and social safeguards must be integrated into mining practices in the hotspot, as has begun to be done with the CEPF project in Phase II in Bolivia. This is a great challenge for CSOs as they must seek comprehensive mechanisms to motivate the competent authority to confront and maintain the KBAs and conservation corridors of the hotspot free of illegal and informal mining activities (WCS *et al.* 2020).

Third, multi-sectorial coordination in the permitting process is needed to prevent the establishment of mines in land use areas incompatible with such these practices. CSOs can be part of this dialogue, as was the case in Bolivia under CEPF's project with WCS, to promote policy changes to improve the permitting process at the national and sub-national levels. These organizations can also work at the community level to facilitate best practices for mining companies and cooperatives working within their jurisdictions. There are successful examples in the Madidi-Pilón Lajas-Cotapata Conservation Corridor in Cajamarca (Peru) and Imbabura (Ecuador) (CEPF 2015).

Fourth, there is a significant need for direct engagement with private sector mining companies. These initiatives can target mitigation and offsets, improving practices to reduce environmental pollution and better establishing better guidelines to reduce impacts in sensitive areas (CEPF 2015).

Finally, the principles of consultation with local communities and free, prior and informed consent (CLPI by its acronym in Spanish) need to be incorporated or strengthened in national laws and regulations. Additionally, mechanisms for redress for affected people need to be established or strengthened.

Hunting and Illegal Trade

Illegal wildlife trade is the fourth most lucrative illicit business in the world (worth between US$7 and US$23 billions worldwide), after drugs, arms and human trafficking. While wildlife trafficking has always existed; in the last 10 to 15 years the severity of this illicit business has grown drastically at the global level (GFI 2017).

In Colombia, the areas with the highest wildlife trafficking are in the Andean region, the coffee-growing region, the central region of the country and the Colombian Caribbean. Through an analysis by the Ministry of Environment, more than 190,000 wild animals had already been seized in 2012, with reptiles and birds being the most affected groups (Toro 2018). In 2017 alone, 23,605 animals were seized in Colombia, with the most trafficked species inside and outside the country being the Colombian silder (*Trachemys callirostris*), red-footed tortoise (*Chelonoidis carbonaria*), green iguana (*Iguana iguana*), orange-chinned parakeet (*Brotogeris jugularis*), yellow-crowned (*Amazona ochrocephala*), blue-headed parrot (*Pionus menstruus*), red-tailed squirrel (*Sciurus granatensis*),white-footed tamarin (*Saguinus leucopus*),white-fronted capuchin (*Cebus albifrons*) and poison dart frogs (*Dendrobatidae* spp.) (El Tiempo de Colombia 2019). In the municipality La Ciénaga, which contains part of the KBAs

Valle del Río Frío (COL116) and Parque Nacional Sierra Nevada de Santa Marta y Alrededores (COL110), illegal trafficking of endemic and/or threatened species constitutes a threat to fauna (Jiménez-Alvarado *et al.* 2015). In the national consultation workshop, it was mentioned that hunting and wildlife trafficking also affect the Reserva Natural Meremberg (COL90).

Ecuador has the second highest number of endangered mammal species in the world, and one of its biggest problems is wildlife trafficking. For example, the illegal trade of mammals either through the sale of live animals, bush meat, skins and others, has drastically reduced the populations of some primate species in the country. According to the Ministry of Environment and Water, 3,000 animals of different species were seized in 2018, despite legislation that provides for fines of up to US$4000 for illegal possession of species and deprivation of liberty for up to four years (El Comercio de Ecuador 2019). To address indiscriminate hunting and wildlife trafficking, the Ministry of Environment and Water has been implementing programs for amphibian and wildlife conservation (Ministerio del Ambiente y Agua 2020). Species subject to hunting and commercialization include white-bellied spider monkey (*Ateles belzebuth,* EN), silvery woodly monkey (*Lagotrix poeppigii*), bearded guan (*Penelope barbata*), spectacled bear (*Tremarctos ornatus,* VU), white-lipped peccary (*Tayassu pecari,* VU), Andean mountain tapir (*Tapirus pinchaque*, EN), and South American Amazonian tapir (*Tapirus terrestris*, VU). For this reason, illegal wildlife trade is one of the greatest threats to biodiversity in Ecuador (Tirira 2013). In the northwestern part of the country, where the KBAs Reserva Ecológica Cotacachi-Cayapas (ECU61) y Territorio Étnico Awá y alrededores (ECU70) are located, commercial hunting is frequent and bushmeat is still openly sold (e.g., at the weekly fair in Hoja Blanca, near Refugio El Pambilar). In the Parque Nacional Sumaco-Napo Galeras KBA sector (ECU52), the product of illegal hunting is sold clandestinely in Loreto (G. Zapata pers. comm.).

In Peru, especially in the Amazon, there are a variety of routes for wildlife trafficking that have national and international final destinations. It is estimated that in 2017, a total of 10,398 animals were seized in Peru through interventions carried out in Lima and other provinces of the country. Among the most sought-after bird species are the red-and-green macaw (*Ara chloropterus*), the American kestrel (*Falco sparverius*), the mitred parakeet (*Psittacara mitratus*), the dusky-headed parakeet (*Aratinga weddellii*), saffon finch (*Sicalis flaveola*) and the white-winged parakeet (*Brotogeris versicolurus*). The white-winged parakeet is the most trafficked species in recent years. A study conducted by WCS between 2016 and 2017, shows that 650 specimens of 10 reptile species were rescued from illegal trade, including the green iguana (*Iguana iguana*), the boa constrictor (*Boa constrictor*) and several species of turtles (*Chelonoidis denticulata,* VU), (*Podocnemis unifilis,* VU) and *Chelus fimbriatus*) (Mongabay 2018). The national consultations highlighted that one of the main threats to the Abra Pardo de Miguel (PER6) and Cordillera del Cóndor (PER31) KBAs is the trafficking of endemic and threatened species, while wildlife trapping is one of the threats to Parque Nacional Tingo María (PER71).

In Bolivia, as of 2011 (according to the DGBAP seizure database) 24 percent of seizures made involved parrots, lizards and iguanas, and 17 percent involved turtles. Between 2014 and 2016, Bolivian authorities seized 337 jaguar (*Panthera onca*) teeth from at least 87 dead individuals in the Parque Nacional Madidi y de la Reserva de la Biosfera y Tierra Comunitaria de Origen Pilón Lajas,[16] within the Yungas Inferiores de Pilón Lajas KBA (BOL37). Trafficking of jaguar parts has increased since 2014, registering different processes of trafficking of parts of this species (including teeth) through advertising by local radio media and on social networks, reaching offers of between US$120 to US$150 per tooth (Nuñez *et. al* 2017). Through a study

[16] https://es.mongabay.com/2016/10/especial-fauna-silvestre-la-venta-jaguares-las-nuevas-victimas-del-trafico-bolivia/

commissioned by IUCN Netherlands (IUCN NL), Earth League International conducted an undercover investigation into poaching and illegal trafficking of the jaguar between 2018 and 2020. The investigation was focused on the search for the criminal networks behind this illegal wildlife trade in which the traffickers' modus operandi, routes and means of transport were revealed. It was concluded that the demand for jaguar parts comes from China.

Some of the initiatives at the regional level to counteract this problem are the Lima Declaration, signed by 10 countries in October 2019 as part of the First High Level Conference of the Americas on Illegal Wildlife Trade and the Alliance for Wildlife and Forests, funded by the European Union, whose actions seek to understand the dynamics of wildlife trafficking, capacity building of local authorities and civil society. These strategic actions have been underway since January 2019 in Bolivia, Colombia, Ecuador, Peru and border areas with Brazil (WCS 2020).

The COVID-19 pandemic has highlighted the importance of this threat, not only for wildlife but also for human health. The implementation and articulation of actions, such as strengthening the capacities of local authorities and CSOs related to the issue, improving the understanding of the dynamics of wildlife trafficking and incorporating society in educational processes on the issue, will contribute to strengthening actions for the reduction of wildlife trafficking in the region, in order to prevent future negative impacts on the health and welfare of people, the economy and ecosystems.

Climate Change

This source of threat is discussed in detail in Chapter 10.

Analysis of the effects of the COVID-19 pandemic in relation to threats to the Tropical Andes Hotspot

The SARS-CoV-2 virus was described from Wuhan Province, China, in December 2019, and four months later spread worldwide as a pandemic (WHO 2020). The virus causes the disease COVID-19, which has led to loss of life and resulted in unprecedented global economic and social impacts, which in the short and long term will be difficult to quantify (ECLAC 2020). However, there is no doubt about its severe impact on the welfare of large segments of the population, which will have repercussions on the conservation status of many natural resources.

According to Rolando Ocampo, Director of ECLAC's Statistics Division,[17] this pandemic has had very serious global and regional repercussions. In the hotspot countries, as in other parts of the world, when the virus spread, governments took preventive and containment measures that led to confinement and social distancing, paralyzing activities considered non-essential, but which represented 50 percent or more of the population's economic dynamism. As a consequence, the economic and social situation has declined, and it is predicted that in 2021, the number of Latin American and the Caribbean people living in poverty will increase from 185 million to 215 million, and unemployment will reach 11.5 percent, affecting 12 million more people than in 2019 (ECLAC 2020).[18] In fact, prior to COVID-19, Latin America already showed little economic growth and progressive social conflicts, which the pandemic has further deepened (see Chapter 7).

---

[17] https://www.paho.org/ish/images/docs/presentacion-dr-Rolando-Ocampo.pdf?ua=1

[18] https://repositorio.cepal.org/bitstream/handle/11362/45337/4/S2000264_es.pdf

The pandemic has negatively affected employment, the fight against poverty and the reduction of inequality in the region and the world (ECLAC 2020). In this context, a severe recession impacted the Andean countries in 2020. Trade and tourism plummeted significantly since the first quarter of 2020 causing catastrophic declines in national GDPs (more information in Chapter 7). There is no doubt that, in the short and medium term, COVID-19's social and economic impacts had direct repercussions on the conservation of natural resources and biodiversity, both negative and positive (Lenzen *et al.* 2020).

A first positive impact of the pandemic could be the decrease in annual global carbon emissions. The World Meteorological Organization's (WMO's) preliminary estimate of a reduction ranges between 4.2 and 7.5 percent. In cities such as Bogota, Buenos Aires and Quito, a drop in NO_2 and CO_2 has been observed for the period corresponding to strict social confinement. Conversely, air pollution increased in rural Andean areas as the demand for wood may have increased as rural families tried to subsist in the face of reduced incomes due to the pandemic. In the absence of public utility services such as gas, wood emerged as the only energy option for the poorest households (Amador-Jiménez *et al*. 2020).

Thus, in the rural Andean region there could be an unprecedented increase in GHG emissions due to increased deforestation. As shown in Table 6.2, deforestation rates in the countries of the Andean region were already trending upward prior to the emergence of COVID-19 (with the exception of Chile), and while it is too early to make a prudent assessment of the effects of the pandemic on deforestation and land-use change in the region, what is clear is that reduced monitoring and surveillance efforts during the pandemic could result in increased forest clearing and carbon emissions due to land-use change (Lopez-Feldman *et al.* 2020).

For example, in Colombia, despite the slight reduction in deforestation during the period 2013 to 2019 (with respect to the period 2001 to 2012), in 2020 deforestation trends increased. This was due to the absence of state presence in strategic areas during the pandemic, which led to armed groups taking advantage of the situation to appropriate biodiverse territories, generating deforestation to develop illicit activities such as the planting of coca crops and illegal mining (Schumacher *et al*. 2020).

In Ecuador, the COVID-19 crisis led to budget cuts by the government for the environment porfolio. Experts say the pandemic may halt, or even set back, government and private efforts to control deforestation (Open Democracy, 2020).

In Colombia, the government also proposed a cut to the budget of Natural Parks in the 2021 budget proposal, which implies that entities related to natural resource management may not be able to fulfill their mission (López-Feldman *et al*. 2020).

Another factor that increased during the months of confinement were the forest fires in many rural Andean areas. During the first days of isolation, forest fire alarms went off in countries such as Colombia. According to an analysis by Open Democracy (2020), fires grew in the Andean region by more than 200 percent compared to last year's rates in the same period.

The phenomenon of migration from urban centers to rural areas also increased during the pandemic. In Peru, for example, fear of disease transmission forced thousands of unemployed citizens to return to the rural areas where they once lived, generating an unexpected repopulation. By April 2020, 167,000 Peruvians in urban areas were asking their local governments to help them move out of the cities to rural towns, generating a high demand for resources and land, directly affecting Andean remnant forests and other patches of vegetation that are isolated and unprotected.[19]

The pandemic may lead one to believe that the slowdown in much economic activity has an effective outcome, promoting a false perception of circumstantial well-being. For example, in the surveys prior to the national consultation workshops, two main threats driven by the COVID-19 pandemic were identified in the Tropical Andes Hotspot: the increase in illegal activities of illegal extraction of natural resources (mining, hunting, species trafficking, timber exploitation, etc.), and the reduction of state capacity for the control of protected areas and natural resources. An example of this occurred in Bolivia, which restricted any type of activity within its natural areas as part of the national response to the pandemic, but during this period, poachers entered the Parque Nacional Madidi due to the absence of park guards. (J.L. Medina 2020, pers. comm.). In May 2020, nearly 200 vicuñas (*Vicugna vicugna*) (LC) were stripped of their skins by poachers in Ayacucho, Peru, who took advantage of the absence of surveillance due to the state of emergency caused by the pandemic.[20]

The pandemic-related retrictions also caused delays in conservation projects and initiatives, with immediate effects on biodiversity conservation and management in the Andes. For example, according to CEPF's 2020 survey of grantees, 85 percent of grantees reported some type of project cancellation due to COVID-19, while 43 percent of projects suffered delays of at least three months. Eleven percent of them speculated that the crisis had increased the economic vulnerability of local communities where CEPF-funded projects were implemented. The consequence could be to increase inequality in vulnerable groups of society, thus increasing the pressure of community members on natural resources (deforestation, collection of plant and animal species, etc.) and increasing the demand of external actors (companies, criminal gangs, etc.) for natural resources (deforestation, collection of plant and animal species, etc.).

Parallel to this reality, there were also adaptative actions that came out of the pandemic and provided rapid responses, such as the use of technological tools and new methods to continue with monitoring programs for two endemic primate species (*Plecturocebus modestus* (EN) and *P*. *ollalae*) in the savannas of Beni in Bolivia. Other mechanisms that allow the identification of priority sites for the conservation of the Andean condor (*Vultur gryphus*, VU) distributed from Venezuela to Argentina also emerged (Mongabay 2020).

In conclusion, economic projections suggest that the hotspot countries, as in many parts of the world, will experience an unprecedented socioeconomic crisis, and that to overcome it, countries will need to design policies that reconcile economic recovery with the Sustainable Development Goals (SDGs) of the 2030 Agenda. This may represent an opportunity to work in a more focused manner on the threats to the region's natural resources and biodiversity, which are common not only to the hotspot countries. For example, in relation to deforestation, in the context of the pandemic, measures can be implemented to protect, expand and create local, national, regional and transboundary protected areas (public and private), as well as indigenous reserves and strategic ecosystems (Schumacher *et al*. 2020).

[19] https://www.nytimes.com/es/2020/04/30/espanol/america-latina/peru-virus-migracion-caminantes.html

[20] https://ecuador.wcs.org/es-es/Recursos/Noticias/articleType/ArticleView/articleId/14694/El-trafico-de-fauna-silvestre-continua-en-los-paises-andinos-amazonicos-a-pesar-del-estado-de-emergencia-sanitaria-por-COVID-19.aspx

7 SOCIOECONOMIC CONTEXT OF THE HOTSPOT

During the last decades, the Andean region experienced an economic boom driven by the increase in prices of raw materials (gas, oil, agro-industrial products, etc.). However, progress has been extremely slow in terms of human development, and huge challenges to achieving environmental, social and economic sustainability still persist (Schorr *et al.* 2018). Significant social tensions have characterized the last five years in the hotspot.

Although income inequality indicators have improved in recent years, social inequalities are still high in the Andean region. Added to this are the economic consequences of the pandemic associated with COVID-19, including the structural transformation of the productive sectors of the Andean region (Beverinotti *et. al.* 2020).

During the pandemic, it was necessary to implement lockdown policies, physical distancing and closure of productive activities. This measure was effective in terms of achieving a decrease in the rate of infections among the population, but it also had dramatic consequences on national and global economies. Latin America and the Caribbean experienced the worst economic, social and productive crisis in 120 years, with a 7.7% contraction of the regional GDP (ECLAC 2020).

As noted above, sustainability, as a fundamental principle of development for the fulfillment of the 2030 Agenda, faces multiple challenges that need to be examined. This chapter provides a description of this socioeconomic context and how it relates to biodiversity conservation. It presents a synopsis of the region's rich human history, describes the contemporary population, and examines recent demographic, development and land use trends, as well as the main economic sectors and trends operating in the region.

7.1 Brief Human History in the Hotspot

Human occupation in the hotspot dates back 13,000 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 12 world centers of origin of cultivated plants for food, medicine and industry (Saavedra and Freese 1986). The pre-Columbian cultures of the central Andes include the Chavín, Moche, Nazca, Paracas, Recuay, Tiwanaku, Wari, Cañari, Muisca, and Inca civilizations, among others. All of these ancient Andean civilizations managed their landscapes on a steep altitudinal gradient, constructing irrigation systems and extensive agriculture on terraces (*andenes*) to maintain crop production during dry seasonal periods. The ancient use of terraces was part of a food security strategy with important implications for adaptation to climatic variations in the Andes (Kendall *et al.* 2006).

The influx of Europeans after the arrival of the Spanish in the Americas in the 16th century transformed the Andean landscape and decimated the human populations due to diseases, wars, massacres and other conflicts associated with the conquest process. The cultures of the indigenous peoples were severely altered by the colonizers and thus began a long process of *mestizaje,* whereby indigenous and Spanish cultures mixed to characterize most inhabitants in the hotspot today. This legacy defines the evolution of contemporary Andean peoples (Roberts 2009). The Andean nations achieved independence in the 19th century. Agrarian and rural systems, based on plantations and large estates, were consolidated from the 18th century onwards and continued well into the 20th century.

The greatest environmental changes since the 19th century have responded, precisely, to certain visions that have promoted the exploitation of raw materials for export with almost no added value, and imported processed goods, knowledge and technology in exchange. This history has been characterized by a succession of booms, with cycles of wealth and subsequent decline (Cuvi 2013). But the transformation of the high Andean landscape since the 19th century cannot be understood solely in terms of its local and intra-regional production dynamics but also in terms of its dependencies on the global economy (Paz and Miño 2020). Conscious of the need to better coordinate the highlands and lowlands, nation states built railroads, which in turn led to disparities/divergences - and asymmetries - between the spaces through which they ran and those through which they did not.

Since 1940, the Tropical Andean nations have intensified their trade links with the United States and ceased to produce highlands-crops (such as wheat) that compete with those of the United States. Monocultures, such as banana and palm oil, and petroleum exploitation have been intensified or developed in the lowlands outside the Andes, but have sustained the growth of high Andean cities such as Quito or Bogotá. Large-scale mining, especially of copper and gold, also increased. The industrialization processes, which had begun in the 1920s, especially in the textile and food sectors, were consolidated thanks to national and international road links, losing the railways in favor of a model based on the automobile. At the end of the 20th century, migration to the cities increased, which grew in a vertiginous and disorderly manner (Cuvi 2013).

7.2 Description of the Population

The population of the seven Andean countries, which have part of their territory within the hotspot, is predominantly mestizo and Spanish-speaking. However, the region is considered the indigenous heartland of South America. There is a concentration of more than 20 million indigenous people belonging to dozens of diverse peoples and nationalities, each with their own forms of organization and political representation (ECLAC 2020). Unlike other regions of the Americas where the ethnic composition of the population is more homogeneous, or where indigenous people live in isolation, or where people of African descent predominate, in the cities, roads and countryside of Ecuador, Peru and Bolivia, a dense indigenous population speaking languages such as Aymara or different variants of Quechua coexists side by side with the mestizo population (Sichra 2009).

Over the last four decades, rural transformation processes in the countries of the region have ended up consolidating rapid urbanization, relatively smaller agricultural sectors, and increased agricultural productivity. This has been accompanied by the persistence and increase in extreme poverty, welfare gaps between urban and rural areas, and inequality. Population growth and urbanization generate changes in food production patterns and in the dynamics of the agri-food system (FAO 2018). The migration of rural population to cities has, in some instances, improved opportunities for access to education, work and services. From a rights perspective, unplanned urbanization has increased the vulnerability of some groups, for example, those forced to live in precarious situations on marginal lands on the periphery of Andean cities (Roberts 2009).

On the other hand, population redistribution in the Andean countries has increased demands for land and water. In mountainous areas, in particular, the growth of cities puts constant pressure on natural resources. Some of South America's largest cities are located within the hotspot, such as the capitals Caracas, Bogota, Quito and Sucre. Other cities such as Lima and Santa Cruz are outside the hotspot but are totally dependent on water emanating from the hotspot to supply large urban populations. Some cities located within the hotspot are part of the most important administrative (La Paz) or economic centers for commerce (e.g., Cali, Ibarra, El Alto, Juliaca, Huancayo, El Alto), industry (e.g., Medellín, Bogotá, Quito), mining (e.g., Potosí, Bucaramanga, San Pedro de Atacama, Juliaca) or tourism (e.g., Cusco, Quito, Baños, Cuenca, Armenia, Medellín, Mérida, Jujuy). These cities constitute the geographic starting points for CEPF's investment in specific KBAs, as well as for the formation of local development partnerships (government and CSOs) and strategic financing with other institutions and projects. Table 7.1 lists major cities in the hotspot and adjacent KBAs.

Table 7.1 Major cities within the hotspot, with elevation, current population and relevance to KBAs

Country	City	Elevation (m)	Population	Adjacent KBAs	Adjacent corridors
Argentina	Jujuy	1,259	335,300	Yala (ARG64) Tiraxi y Las Capillas (ARG60) Cerro Negro de San Antonio (ARG5) La Cornisa (ARG14)	
	Salta	1,152	608,400	Quebrada del Toro (ARG37) Cerro Negro de San Antonio (ARG5) La Cornisa (ARG14)	
	San Miguel de Tucumán	500	864,700	Sierra de San Javier (ARG53) Sierra de Medina (ARG52)	Yungas de Tucumán
Bolivia	Cochabamba	2,558	2,029,000	Cochabamba (BOL48)Vertiente Sur del Parque Nacional Tunari (BOL32)	Isiboro-Amboró
	El Alto	4,150	944,000	Mallasa-Taypichullo (BOL51) Parque Nacional Tuni Condoriri (BOL46)	Madidi-Pilón Lajas-Cotapata
	La Paz	3,640	2,927,000	Mallasa-Taypichullo (BOL51) Parque Nacional Tuni Condoriri (BOL46)	Madidi-Pilón Lajas-Cotapata
	Potosi	4,067	902,000	_	_
	Sucre	2,810	350,000	_	_
	Tarija	1,854	583,000	Reserva Biológica Cordillera de Sama (BOL26) Río Guadalquivir (BOL50)	Tarija-Jujuy
Chile	San Pedro de Atacama	2,407	10,434	Reserva Nacional Los Flamencos-Soncor (CHI10) Río Vilama (CHI14)	Puna Trinacional
Colombia	Armenia	1,551	304,314	Cañon del Río Barbas y Bremen (COL14)	Noreste de Quindío
	Bogotá	2,625	8,393,408	Humedales de la Sabana de Bogotá (COL44) Parque Nacional Natural Chingaza y alrededores (COL61)	Cordillera – Oriental-Bogota

Country	City	Elevation (m)	Population	Adjacent KBAs	Adjacent corridors
	Bucaramanga	959	529,374	Cerro La Judía (COL21)	Norte de la Cordillera Oriental
	Cali	997	2,497,562	Bosque de San Antonio/Km 18 (COL7) Parque Nacional Natural de Cali (COL65)	Paraguas-Munchique-BosquesMontanos del Sur de Antioquia
	Ibagué	1,248	580,282	Cañon del Rio Combeima (COL15)	Noreste de Quindío
	Manizales	2,160	402,998	Reserva Hidrográfica, Forestal y Parque Ecológico de Río Blanco (COL84)	Noreste de Quindío
	Medellín	1,495	2,576,133	Cerro de Pan de Azúcar (COL20) San Sebastián (COL97)	Sonsón-Nechi
	Pereira	1,411	481,509	Cañón del Río Barbas y Bremen (COL14) Bosques del Oriente de Risaralda (COL10)	Noreste de Quindío
	Popayan	1,760	289,986	Reserva Natural Cajibío (COL85)	
Ecuador	Baños	1,815	25,043	Yungilla (ECU78) Manteles-El Triunfo-Sucre (ECU8)	Cotopaxi-Amaluza
	Cuenca	2,560	636,996	Yanuncay-Yanasacha (ECU77) Cajas-Mazán (ECU20)	Oeste de Azuay
	Ibarra	2,225	221,149	Valle del Chota (ECU98) Reserva Ecológica Cotacachi-Cayapas (ECU61) Parque Nacional Cayambe-Coca (ECU59)	Awá-Cotacachi; Illinizas; Nororiental
	Loja	2,060	274,112	1 km al oeste de Loja (ECU1) Uritusinga Cerro Ventanas y Villonaco (ECU97) Abra de Zamora (ECU2) Parque Nacional Podocarpus (ECU50)	Sangay - Podocarpus
	Quito	2,850	2,781,641	Mindo y Estribaciones Occidentales del volcán Pichincha (ECU44) Volcán Atacazo (ECU75)	Awá-Cotacachi-Illinizas
Peru	Arequipa	2,335	869,351	Chiguata (PER24) Reserva Nacional Salinas y Aguada Blanca (PER83)	
	Cajamarca	2,750	226,031	Río Cajamarca (PER78) San Juan Cajamarca (PER117)	
	Chachapoyas	2,235	29,869	Rio Utcubamba (PER84)	Noreste de Peru
	Cusco	3,399	427,218	Lagunas de Huacarpay (PER56) Valle Urubamba área cerca de Taray (PER121)	

Country	City	Elevation (m)	Population	Adjacent KBAs	Adjacent corridors
	Huancayo	3,259	364,725	Área de Conservación Regional Huaytapallana (PER99)	
	Juliaca	3,825	273,882	Laguna de Chacas (PER51)	
	Moyobamba	860	56,452	Moyobamba (PER65) Entre Puerto Balsa y Moyobamba (PER14)	Noreste de Peru
Venezuela	Caracas	900	2,090,479	Parque Nacional El Ávila y alrededores (VEN2) Parque Nacional Macarao (VEN10) Monumento Natural Pico Codazzi (VEN3)	Cordillera de la Costa Central
	Merida	1,600	1,059,925	Parque Nacional Páramos Batallón y La Negra y alrededores (VEN21) Parque Nacional Tapo-Caparo (VEN16) Parque Nacional Sierra Nevada (VEN15)	Andes Venezolanos

7.3 Regional and National Demographics

The Tropical Andes Hotspot covers 106 departments, provinces, states or regions of the seven Andean countries and 3,279 smaller units including municipalities, districts, parishes, communes and townships. Following the method used in 2015 for the elaboration of the ecosystem profile, the hotspot population estimate is based on information from the statistical agencies of each country and the projections they make of the population to 2020 of 54 major units with 40 percent or more of their area within the hotspot. Thus, we approximate that 59.73 million people live in the Tropical Andes Hotspot (Table 7.2 and more details in Appendix 7.1). However, many millions more outside the hotspot depend on the environmental services provided by Andean ecosystems.

Colombia is the country with the largest population within the hotspot, with 29.8 million people, followed by Peru, with 9.18 million people. In terms of population density, Venezuela stands out with 161 people per km^2, followed by Colombia with 132 people per km^2. Regionally, 28.6 percent live in the hotspot.

Table 7.2 National statistics and population estimates within the Tropical Andes Biodiversity Hotspot

Country	Population (millions)		Average population density (people/km2)	
	National (projected to 2020)	Total hotspot	National	Hotspot
Argentina	45.3	2.02	15	28
Bolivia	11.5	6.09	10	15
Chile	18.6	0.16	24	5
Colombia	50.2	29.8	43	132
Ecuador	17.3	7.34	63	63
Peru	33.3	9.18	24	24
Venezuela	32.4	5.09	34	161
	208.7	59.73 (28.6% of the regional population)	Regional average: 30	Average in hotspot: 61

Sources: Ecosystem Profile 2015; CEPALSTAT 2020, national population and average population density data; INDEC-Argentina 2010, INE-Bolivia 2012, INE-Chile 2012, DANE-Colombia 2018, INEC-Ecuador 2020, INEI-Peru 2017 and INE-Venezuela 2018 for subnational census data used for hotspot population estimates.

For the period 2015 to 2020, ECLAC (2020) reports that the population of urban areas in the hotspot countries would have increased at annual rates of between 0.95 percent in Chile and 2.10 percent in Bolivia. Similarly, 84 percent of the population would be living in urban areas and the remaining 16 percent in rural areas, as shown in Table 7.3.

Table 7.3 Urban and rural population in the hotspot countries and growth rates in the 2015 to 2020 period (average annual rates per 100 inhabitants)

Country	Projected population to 2020 (in millions)			Growth rate		
	Urban	Rural	National	Urban	Rural	National
Argentina	41,916	3,387	45,302	1.06	-0.94	0.96
Bolivia	8,245	3,319	11,564	2.10	0.01	1.43
Chile	16,708	1,914	18,622	0.95	-0.70	1.24
Colombia	40,678	9,523	50,201	1.21	-0.84	1.37
Ecuador	11,462	5,873	17,335	1.96	0.43	1.69
Peru	26,767	6,548	33,315	1.61	-0.42	1.58
Venezuela	29,284	3,117	32,401	1.37	-0.55	-1.13
Total	**175,060**	**33,681**	**208,741**	N/A	N/A	N/A
	84%	**16%**				

Source: CEPALSTAT 2020

A] ECLAC: Economic Commission for Latin America and the Caribbean - CELADE. ECLAC Population Division. Revision 2019 and United Nations, Population Division. Department of Economic and Social Affairs. World Population Prospects. Revision 2019. https://population.un.org/wpp/DataQuery/

The annual growth trend of the urban population in hotspot countries documented the previous ecosystem profile is maintained. In contrast, the growth trend of the rural population varies, especially in Peru and Venezuela, which are now registering a negative growth rate. However, as mentioned in Chapter 6, the COVID-19 pandemic has caused urban-rural migration in the Andean countries. It is still too early to tell whether or not this is a passing phenomenon.

One of the most notable demographic phenomena in the region is population aging, derived from the decline in fertility and the increase in life expectancy. The 2010 round of censuses showed that the populations of indigenous peoples continued to be younger than non-indigenous populations, mainly as a result of higher fertility levels, although with significant diversity among countries.

The average population density of the hotspot is 61 people per km^2, but varies greatly by country and geographic region. Across the hotspot, population density is by far the highest in the populated capital districts of Caracas (530 people/km^2) and Bogota (526 people/km^2). At the other extreme, the low population density (5 people/km^2) of the small Chilean portion of the hotspot reflects its rural character. Bolivia's hotspot area 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.

7.3.1 Regional and National Demographics

The Tropical Andes Hotspot is home to a multitude of peoples and nations with cultures, languages, and ritualistic understandings unique in the world. As a result, many inhabitants of the hotspot self-identify as indigenous and make up a significant portion of the national population in some countries, as represented in Table 7.4. The indigenous population in the seven Andean countries constitutes 10 percent of the total, but their territories occupy at least 21 percent of the hotspot area.

Table 7.4 Indigenous Population as a Percent of the National Population in the Hotspot Countries

Country	**Percent and estimated indigenous population to 2020**		
	Total population	**Indigenous population**	**Percent**
Argentina	45,302,450	1,078,475	2.4%
Bolivia	11,564,184	4,801,213	41.5%
Chile	18,621,991	2,305,627	12.4%
Colombia	50,200,930	2,208,841	4.4%
Ecuador	17,335,452	1,218,666	7.0%
Peru	33,314,783	8,649,392	26.0%
Venezuela	32,401,317	862,267	2.7%
Total	208,741,107	21,124,481	10.1%

Sources: CEPALSTAT 2020; CEPAL 2020.

The updated information available at the national level showed that in Peru, 828,894 people self-identify as Afro-Peruvian, according to the National Censuses conducted in 2017. In Colombia, meanwhile, the 2018 Living Standards Measurement Study (ECV by its acronym in Spanish) reported a total of 4,671,160 people who self-identify as Afro-Colombian. In Venezuela, Ecuador and Bolivia, there is a significant Afro-descendant population, but their numbers tend to decrease in the Tropical Andes hotspot region.

Table 7.5 presents a list of indigenous and Afro-descendant peoples and nationalities living in the areas overlapping the hotspot in each country. Across the Tropical Andean region, the most numerous are descendants of the Incas, known as Quechua in Peru, Bolivia and Chile, and Kichwa in Ecuador. Within the hotspot, the Aymara live in the Lake Titicaca region of southern Peru, Bolivia and northern Chile; the Guarani in Bolivia and Argentina; the Awá at the border region between Ecuador and Colombia; and Afro-descendant groups in separate areas of Venezuela, Colombia, Ecuador, Bolivia and northern Argentina. Some examples of KBAs closely related to indigenous populations are the Parque Nacional Perijá (VEN12), home to the Yupka people on both sides of the Colombian-Venezuelan border; the Parque Nacional Natural Sierra Nevada de Santa Marta y alrededores (COL110), home to the Arawak and Kogui peoples; the Territorio Étnico Awá y alrededores (ECU70) and the Reserva Natural La Planada (COL88), which are part of the territory of the Awá nation in Ecuador and Colombia; Yungas Inferiores de Pilón Lajas (BOL37), an indigenous territory of the Tsimané Moseten of Bolivia; Cristal Mayu y Alrededores (BOL14) and Yungas Superiores de Carrasco (BOL40), both in Cochabamba, Bolivia, which is predominantly Quechua; and Cordillera de Colán (PER28) and Río Utcubamba (PER84), both with a significant Awajún population in the Amazonas department of Peru.

Table 7.5 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	12	Aymara, Guaraní, Kallawayas, Mojeño, Moseten, Maropa, Quechua, Tacana, Tsimane, Yuki, Yuracare, Afro-descendant
Chile	3	Atacameño, Aymara, Quechua
Colombia	16	Awá, Bari, Coconuco, Embera, Eperara, Guambiano, Ingá, Ika, Kogui, Wiwa, Nasa, Paez, Pasto, Totoró, U'wa, Afro-descendant
Ecuador	6	Awá, Andean Kichwa (including Pasto, Otavalo, Karanqui, Natabuela, Kayambi, Kitucara, Panzaleo, Chibuelos, Salasaca, Kisapincha, Waranka, Puruháes, Kañari, Saraguro and Palta), Amazonian Kichwa, Shuar, Achuar and Afro-descendant
Peru	13	Ashaninka, Asheninka, Atiri, Awajún, Aymara, Candoshi-Shapra, Caquinte, Chachapoyas-Lamas, Jaqaru, Omagua, Poyenisati, Quechua (including Yaru, Huanca, Chancas, Quero and Wari), Wampis
Venezuela	3	Bari, Yupka and Afrodescendant

Sources: CEPF 2015 and 2020 ecosystem profile update.

In all hotspot countries, indigenous and Afro-descendant groups and nationalities are represented by their local and regional organizations and national federations (more on this in Chapter 9). In the Andes, any conservation, development or natural resource management initiatives involving indigenous lands or other interests will only have a chance of being implemented and succeeding if partnered from the start with entities that represent indigenous peoples and nationalities politically.

7.3.2 Worldview of Native Peoples

The extraordinary biological, geological and climatic richness of the Tropical Andes has shaped a heterogeneous cultural diversity, enriched by the close coexistence of multiple indigenous and native worldviews. Several indigenous perspectives and concepts enrich the cultural fabric of the Tropical Andes. These include the idea of *Pachamama* or Mother Earth; the notion of the collective in the management of the territory and natural resources; community life and the relationships of exchange; barter, complementarity and reciprocity in the collective unpaid voluntary work in favor of the community (*mingas*); the enhancement of traditional agricultural technologies; and the exercise of indigenous justice. On the other hand, the creole worldview considers that the non-human, nature, must be civilized and domesticated, that land is private property and that monetary exchanges are good regulators of human relations (Cuvi 2013). This worldview is manifested by institutions such as the State, Church, *haciendas*, industries, companies and is inspired, above all, by modern Western European philosophies and systems of government.

Through the concepts of sumak kawsay (Quechua), suma qamaña (Aymara), kume mongen (Mapuche), utz k'aslemal (Maya), ñande reko (Guaraní), lekil kuxlejal (Tzeltal) and shiir waras (Achuar), among many others, indigenous peoples refer to their own notions of well-being or "good living". Underlying this notion is the idea of mutual dependence between human beings, their natural environment and ancestral beings, as well as the conceptualization of cultures as multiple and plural realities. In this sense, this notion implies a break with Western ideologies and their pretended universalism and is not homologous to the Western notion of progress or continuous development—with a future horizon—as a condition for achieving well-being. It is, rather, a present well-being, built from the harmonious coexistence of humans and non-humans, recognizing the differences and promoting complementarities among all beings that dwell in the indigenous universe. It is, then, a systemic, ecocentric or biocentric concept (Vanhulst 2015).

Although Spanish is the official language throughout the region, the national governments of Colombia, Ecuador, Peru and Bolivia are making efforts to preserve minority languages by recognizing them as official languages and re-introducing bilingual education in rural areas. Residents of rural areas in the Andes generally have no knowledge of English unless they work in tourism businesses. Internet use is very basic, although states have made significant efforts to promote its use due to the COVID-19 pandemic, particularly for virtual education.

7.3.3 Migration

Historically, Colombia, Ecuador and Peru have been countries of origin for migratory flows; however, they have now become destination countries. Venezuelan migration does not yet represent a significant percentage of the population of these countries, but the number of Venezuelan migrants in these countries is still substantial and has a real impact, given that the majority have arrived in the last three years.

In all Andean countries, there is a marked trend of rural to urban migration and, to a lesser degree, rural to rural migration. This migration has occurred for various reasons, including the opportunity for employment and better access to markets that translate into increased income, as well as access to better social services such as secondary education and health care. This decapitalization of rural areas generates rural-to-urban migration; dispossession; accumulation of capital by local or transnational elites; land, water and market grabbing; environmental contamination and health impacts on workers, residents and consumers, among others (Pastor 2019).

Indigenous people have been part 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 further afield, especially to Spain, Italy and the United States for job opportunities in domestic service, agriculture and the construction sector. In general, indigenous people continue to be marginalized to a greater extent than mestizo populations throughout the hotspot. However, there are exceptions, such as some Otavaleño populations in 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 migrants abroad to their families at home and income derived from remittances, which represent an important percentage of the GDP in some hotspot countries.

Over the last twenty years, the trend of outward migration has not only improved family incomes in many parts of the Andes but has also severely affected the family structure of indigenous communities. Recently, however, the trend of outward migration - especially to Europe - and the corresponding remittances have declined significantly. Table 7.6 shows trends of a reversal of migration processes in practically all hotspot countries. In the last decade, this has been the case in Bolivia, Chile, Colombia, Ecuador and Peru, not so in Argentina and much less so in Venezuela, which had an outflow of approximately 4.7 million people in 2019 alone (Abuelafia 2020). However, ECLAC's 2020 projections show a new change in trajectory in almost all countries (ECLAC 2020).

Table 7.6 Migration rate (rate per 1,000 population)

Country	Periods		
	2010 – 2015	2015 - 2020	2020 - 2025
Argentina	0.14	0.11	0.08
Bolivia	-1.10	-0.84	-0.63
Chile	1.87	6.02	-3.75
Colombia	-0.83	4.16	-3.47
Ecuador	-0.49	2.15	-1.20
Peru	-4.20	3.12	-1.89
Venezuela	-2.95	-22.33	10.85

Source: ECLAC: Economic Commission for Latin America and the Caribbean - CELADE. ECLAC Population Division. Revision 2019 and United Nations, Population Division. Department of Economic and Social Affairs. World Population Prospects. Revision 2019. - https://population.un.org/wpp/DataQuery/

However, not only are there migratory movements from rural to urban areas in the region but intra-regionally as well (CEPF 2015; ECLAC 2017). Cities not only attract people from the countryside but immigrants from other Latin American countries as well. Many are from the Andean region and currently account for around 78 percent of Latin American immigrants. This increase in intra-regional immigration is consistent with the international mobility trends noted in the International Organization for Migration report (IOM 2018).

The other distinct element observed with respect to human mobility is the shift from rural-urban migration to migration between urban centers (ECLAC 2017). A final and new pattern for the 2015 - 2020 period is the intense migratory flow from Venezuela (IOM 2018). As of 2019, the estimated number of migrants from that country arriving in the other Latin countries was 3 million, out of a total of 4.7 million people who left Venezuela that year. Today, Venezuelans represent 3.6 percent of Colombia's population, 1.2 percent of Peru's, and 5 percent of Ecuador's (Abuelafia 2020).

7.3.4 Urbanization

The accelerated process of urbanization in the hotspot influences the loss of visibility of the contributions, potential and opportunities that the rural world offers for sustainable development. One of the consequences of the increased growth of the urban population is the tendency to standardize public policies that look at the population as a whole without adequate differentiation to reduce socioeconomic asymmetries and close territorial gaps. Therefore, it is necessary to develop differentiated policies in important sectors, such as infrastructure, education, health, agriculture, social protection, gender equality, that revitalize the rural dimension and its interaction with cities and their demands.

As mentioned by FAO (2019), "... it is not enough to make marginal adjustments to the dynamics of rural development, it is also necessary to deepen the structural transformation of the rural world, strengthening and guiding it in the economic, social and environmental spheres. Rural development is a multidimensional issue that offers opportunities in agriculture, food systems and energy development, as productive areas in which the region can make great strides toward meeting the Sustainable Development Goals (SDG) targets. To do so, however, the existing lags in the rural sphere must be overcome".

In the Tropical Andes region, two major orientations in agricultural production systems coexist: one that takes place in family units and another that is industrially oriented. The agri-food systems that are part of food security and sovereignty policies are mainly linked to agriculture that takes place in rural areas. The intensification of agriculture combines a new agricultural revolution associated with exponential technological changes occurring globally (e.g., robotics, sensors, precision agriculture, *blockchain*, etc.). While family farming promotes agroecological production models, the revaluation of peasant labor, agrobiodiversity and local knowledge, and agribusiness aims at efficiency in food production and articulation to global consumption markets.

7.3.5 Role of Gender in Development and Conservation

Latin America is the most unequal region in the world, with the greatest inequality in income distribution, according to the 2019 Human Development Report of the United Nations Development Program (UNDP). On different occasions, ECLAC has also flagged this as a trend that is reproduced when talking about gender.

For example, in Latin America, women in rural areas have higher illiteracy rates and lower secondary education attendance rates (Trivelli *et al.* 2019). This is linked to the lower female participation in the laborforce: women’s labourforce participation rate is 59 percent, compared to 79 percent for men, according to the Gender Equality Observatory for Latin America and the Caribbean.

This trend was reflected in the surveys conducted as part of the process to update the profile of the CSOs in the hotspot. In these surveys, it was observed that the number of male members in CSO teams is greater than the number of female members, with a ratio of approximately 60:40, with the exception of Bolivia, which reports the opposite, with 54 percent of members being women. Despite these figures, the vast majority of the CSOs surveyed in Ecuador, Colombia, Bolivia and Peru have women representatives in executive and management positions, a fact that was corroborated in the interviews conducted as a complement to this activity (see Chapter 9). This reality is repeated in Argentina, according to data from the Survey of Living Conditions (ECV by its acronym in Spanish) conducted by the Directorate of Statistics and Economic Research (DEIE by or its acronym in Spanish) in 2016. The data show that despite the progress made in gender equality and women's labor market participation in that country, an unbalanced cultural model of responsibilities and rights still prevails behind closed doors.

The agricultural sector is also segregated by gender, with land ownership, access to credit, and other means of production dominated by males. By way of example, the proportion of female landowners in the region ranges between only 7.8 and 30.8 percent in some places (FAO 2017). If it is understood that this productive resource is fundamental for income generation and people's well-being, its lack or limited access undermines women's (and their families') development possibilities. These data are corroborated by ECLAC, which states that women in the agricultural sector spend more hours in unpaid and informal work than men (Muñoz 2019). At the same time, the increase in women's participation in agriculture as producers, whether salaried or not, does not go hand in hand with an equitable distribution of productive and reproductive work between women and men. This is because women's productive work is compounded by reproductive work, whereby they must allocate time and resources to feed and care for their families, maintain the house and cultivate the fields. According to the FAO study (2017) in Bolivia, women's participation is more marked in activities that involve time and physical effort, such as planting, weeding and harvesting. Conversely, they participate less in the links of the productive chain associated with the generation of higher incomes.

Regarding the role of women in natural resource management and protected area systems, there are some documented experiences, research, regulations and laws with a gender perspective in the Andean region. In addition, there are governmental mechanisms aimed at promoting gender mainstreaming in natural resource management; however, institutionalization is still a pending task. This was evident in the results of the surveys conducted among the CSOs in the hotspot. With the exception of Colombia, the vast majority of the CSOs in Peru, Ecuador and Bolivia have a gender policy in their institutions, and thus also an explicit institutional mandate to incorporate gender mainstreaming in their social and conservation projects. The majority of CSOs in Bolivia and Colombia consider gender in their budgets and allocate the necessary economic and human resources in their projects to cover this approach (see Chapter 9).

Although in Latin America in general, and in the Andean region in particular, progress is indisputable, gender discrimination still persists. It is against this backdrop that (male and female) stakeholders interviewed as part of the reprofiling process noted that it is essential to systematically analyze the progress of gender equality in the Tropical Andes. They highlighted the importance of developing concrete projects to support the empowerment of women in various fields, and placing special emphasis on strengthening women's capacities to narrow the inter-gender gap and to provide equal and fair access to all opportunities.

7.4 Human Development and Poverty

Although recent evidence shows that income redistribution has improved in the region since 1990, some countries are among the most unequal in the world, both in terms of income and access to services (Brezzi *et al.* 2016). In the hotspot countries, income inequality was lower in 2018 compared to 2000.

Table 7.7 Income distribution: Gini coefficient, years 2000 and 2017

Country	Year 2000	Year 2017	Reduction 2000 - 2017
Argentina	0.51	0.41	0.10
Bolivia	0.62	0.44	0.18
Chile	0.53	0.44	0.09
Colombia	0.59	0.50	0.09
Ecuador	0.56	0.45	0.11
Peru	0.49	0.43	0.06
Venezuela		---	---

Source: World Bank 2020.
https://datos.bancomundial.org/indicator/SI.POV.GINI?end=2018&locations=EC&start=2018&view=bar

The Gini index (or coefficient) is a measure of the distribution of income across a population. It varies from 0 to 1, where 0 implies perfect equality and 1 the opposite. The data in Table 7.7 show that, among the hotspot countries, Bolivia reduced inequality the most (from 0.62 in 2000 to 0.44 in 2017), followed by Ecuador (from 0.56 in 2000 to 0.45 in 2017). In Peru, the reduction in the gap was the smallest in the region (from 0.49 in 2000 to 0.43 in 2017), followed by Chile and Colombia, with a 0.09 reduction between 2000 and 2017.

The region's efforts to reduce inequalities are important. Two UNDP indexes shown in Table 7.8—the Human Development Index (HDI) and the Multidimensional Poverty Index (MPI)—offer insights in this regard. The HDI evaluates life expectancy, access to education, and standard of living (income per capita), while the MPI evaluates the prevalence and intensity of deprivations in health, education, and standard of living (income per capita). The latter complements the income-based poverty measurement.

Table 7.8 Relevant development indicators in the hotspot countries

Country	Human Development Index, 2018	Multidimensional Poverty Index 2007-2018
Argentina	0.830	--
Bolivia	0.703	0.094
Chile	0.847	--
Colombia	0.761	0.020

Ecuador	0.758	0.018
Peru	0.759	0.253
Venezuela	0.726	--

Source: http://hdr.undp.org/sites/default/files/hdr_2019_overview_-_spanish.pdf

The HDI ranges from 0 to 1, where 0 implies the minimum values in the dimensions analyzed (life expectancy, access to education, and standard of living) and 1 the opposite. Therefore, the closer to 1, the better. Table 7.8 above shows that the countries of the Andean region have an HDI between 0.7 and 0.8, i.e., high human development. However, the levels of multidimensional poverty reflect a different situation, as in the case of Ecuador, where a large majority of its population has a lack of basic needs (0.018).

Poverty reduction measures adopted in the countries of the Andean region have resulted in an increase in the middle class and its consumption capacity. Analyses by multilateral agencies indicate that Argentina and Chile have increased their middle-class population faster than Bolivia, Colombia, Ecuador and Peru. This perspective, however, does not necessarily mean that basic indicators of equity and inclusion, well-being and sustainable development have improved.

Within the hotspot there are large disparities in the distribution of wealth and in human well-being. Subnational cities and regions show enormous heterogeneity in their well-being indicators compared to national averages. In general, the latter hide territorial inequalities between subnational jurisdictions, which become evident when analyzing GDP per capita (OECD 2019).

Chile and Venezuela are the two countries in the hotspot that do not register poverty indexes. Both Bolivia and Colombia have higher levels of poverty and extreme poverty at the national level, and in all countries in the region, the incidence of poverty and extreme poverty is higher in rural areas (Table 7.9).

Table 7.9 Population living in extreme poverty and poverty (percentage of total population in each geographic area)

Country	**Extreme poverty**			**Poverty**		
	National	**Total urban area**	**Total rural area**	**National**	**Total urban area**	**Total rural area**
Argentina	--	3.6	--	--	24.4	--
Bolivia	14.7	5.3	36.2	33.2	23.4	55.5
Chile	--	--	--	--	--	--
Colombia	10.8	7.3	22.7	29.9	26.0	43.4
Ecuador	6.5	3.7	12.6	24.2	19.7	33.8
Peru	3.7	1.5	11.6	16.8	11.7	34.8
Venezuela	--	--	--	--	--	--

Source: [A] ECLAC: Economic Commission for Latin America and the Caribbean - Based on household surveys of the countries. Household Survey Data Bank (BADEHOG by its acronym in Spanish).
Notes
The percentage of poor people includes people below the extreme poverty line.

Hotspot KBAs are often located in remote areas that are difficult to reach due to lack of communication routes and are characterized by pockets of extreme poverty. Examples include the Bosque de Polylepis de Madidi (BOL5), the Corredor Ecológico Llanganates-Sangay (ECU29) and Kosñipata-Carabaya (PER44) or La Victoria (Nariño) (COL122). Charcoal production is the main economic activity in the latter.

7.4.1 Economic Profile of Hotspot Countries

Argentina

Argentina is one of the largest economies in Latin America, with a gross domestic product (GDP) of approximately US$ 445 billion and abundant natural resources in energy and agriculture. In its 2.8 million km2 of territory, the country has extraordinarily fertile agricultural land, significant reserves of oil, gas, uranium, silver and lithium, and enormous potential in renewable energy. Argentina is a leader in food production, with large-scale industries in the agriculture and beef cattle sectors. It also has great opportunities in some manufacturing sub-sectors and in the high-tech innovative services sector. However, the historical volatility of economic growth and the accumulation of institutional obstacles have impeded the country's development. The COVID-19 pandemic and social distancing as a way to combat it aggravated the situation. Urban poverty in Argentina remains high and in the first half of 2020 reached 40.9 percent of the population, with an extreme poverty rate of 10.5 percent and child poverty (children under 14) of 56.3 percent.

Bolivia

Bolivia's economy is highly dependent on international commodity prices. Bolivian exports are concentrated in primary goods, mainly natural gas (82 percent of Bolivia's total exports were concentrated in natural gas at the end of 2019), minerals, and soybeans. However, when the boom of raw materials ended, Bolivia resorted to high public spending and increasing domestic credit to maintain economic growth despite falling gas prices and export volumes. These measures resulted in an increase in public debt and a gradual reduction of the macroeconomic cushion accumulated in the bonanza.

In 2019, China was the eighth ranked destination for Bolivian exports. Bolivian exports are concentrated in few products and few markets, the two most important being Brazil and Argentina for natural gas. Trade with China accounts for 4.5 percent of the total value of Bolivian exports with the main products exported to that country being gold, zinc, lead and copper ores. At the end of 2019, about 22 percent of all Bolivian imports came from China, making it the main source of imports. Imported products include machinery and equipment, chemicals, vehicles, metals, household appliances and textiles. Bolivia shows a greater dependence on China for imports of both consumer goods and capital goods.

China has become Bolivia's main bilateral creditor. As of February 2020, 9.3 percent of Bolivia's total external debt was financed by China. COVID-19 could force the Asian country to reorient its investments differently and force Bolivia to seek other sources of financing.[21]

On the other hand, the deterioration of the global economic situation has slowed the pace of poverty and inequality reduction. In the face of the global coronavirus crisis, the authorities have deployed different economic initiatives to protect the most vulnerable populations. These

[21] https://publications.iadb.org/publications/spanish/document/El_impacto_del_COVID-19_en_las_econom%C3%ADas_de_la_regi%C3%B3n_Regi%C3%B3n_Andina.pdf

include measures such as cash transfers, deferral of payments of some taxes and financial sector credits, and partial payment of water and electricity bills. However, the global economic downturn, aggravated by the collapse of oil prices, and social distancing measures, including a national quarantine, have resulted in an economic contraction and an increase in poverty.

Bolivia's GDP contracted eight percent in 2020 and the poverty rate rose from just over 30 percent to close to 40 percent (CESLA 2020). This sharp decline was due in part to limitations in the ability of the government to take remedial macroeconomic measures and difficulties in receiving approval of external credits to address the emergency. In this context, the authorities turned to the Central Bank of Bolivia (BCB by its acronym in Spanish) to finance both the public and financial sectors. Given the health emergency, efforts to contain the human cost of the crisis and lay the groundwork for economic recovery still required support. Post-crisis challenges, however, require Bolivia to consolidate macroeconomic stability, reduce its fiscal and external deficits, promote the development of private investment to diversify the economy, generate quality jobs, establish mechanisms to protect the vulnerable and make families more resilient to shocks.

Chile

Chile's economy is based on mining, which takes place in 13 of the country's 15 regions. Twenty-five different products are extracted, including copper, lithium and iodine. Livestock and agriculture are the main activities in the central and southern regions of the country. The most widely grown agricultural products are cereals (oats, corn and wheat), fruits (peaches, blueberries, plums, apples, pears and grapes) and vegetables (garlic, onions, asparagus and beans). The export of fruits, vegetables, crustaceans, fish and forestry products have reached historic levels with the opening of the Asian and European markets.

Chile's economy has grown rapidly in recent decades, due to a solid economic framework that has allowed it to cushion the effects of a volatile international context. However, more than 30 percent of the population is economically vulnerable and income inequality remains high. In a widespread context of discontent and social outrage, GDP growth slowed from 3.9 percent in 2018 to 1.1 percent in 2019. Disruptions in economic activity caused a slight uptick in unemployment from 7.1 percent in December 2018 to 7.4 percent in December 2019. The 2019 – 2020 Chilean social protests led to a change in public spending, with less dedicated to investment promotion and more to social spending. It also led the government to call for a referendum in October 2020, the result of which paved the way for a structural reform of the constitutional framework in place since the dictatorship era.

Colombia

The Colombian economy is fundamentally based on the production of primary goods for export and consumer goods for the domestic market. One of the most traditional economic activities is the cultivation of coffee, Colombia being one of the world's largest exporters of this product. Colombia's oil production is one of the most important on the continent: exports of oil and its derivatives accounted for 40 percent of total exports in 2019. Coal mining, extraction and export of gold, emeralds, sapphires and diamonds are also important sources of income. Floriculture, banana cultivation, and livestock are important agricultural and livestock sectors. In the industrial sector, textiles, the automotive, chemical and petrochemical industries stand out.

Colombia has a track record of prudent fiscal and macroeconomic management, anchored by an inflation targeting regime, a flexible exchange rate and a rules-based fiscal framework, which has allowed the economy to grow steadily since 2000. In addition, Colombia has halved poverty over the last ten years. However, productivity growth is low and has been an obstacle to economic growth. A large infrastructure gap, low labor productivity and trade integration, and barriers to domestic competition are some of the factors limiting total factor productivity growth. Exports are highly concentrated in non-renewable commodities (oil in particular), which increases the economy's exposure to price shocks. In addition, Colombia is one of the Latin American countries with the highest income inequality and labor market informality.

After slowing to 1.4 percent in 2017, economic growth picked up to 3.3 percent in 2019, driven by robust private consumption and higher investment. Growth was on track to accelerate further in 2020, but the COVID-19 pandemic significantly hit the economy and triggered a very deep recession. The Colombian government responded quickly to the crisis and took targeted fiscal measures in the health sector and social protection. It also introduced tax policies and credit measures targeted at companies in specific sectors or that were affected by the crisis, totaling potentially US$20.7 billion (or 6.8 percent of 2019 GDP).

These measures helped to mitigate the impact of COVID-19 on the economy. The economy contracted 7 percent in 2020, and a rebound in growth is projected in 2021 of 5 percent provided the pandemic is contained.

Colombia's exposure to the Chinese market is relatively low. Exports of goods made to China accounted for 1.4 percent of GDP (11 percent of total exports) in 2019. Whereas, exports to the United States (29 percent of total exports) and the rest of the world accounted for 3.5 and 7.5 percent of GDP, respectively. This dynamic contrasts with other countries in the region, such as Chile and Peru, where exports to China represent 7.8 and 5.3 percent of GDP, respectively.

Ecuador

The Ecuadorian economy is highly dependent on the production and export of oil and traditional agricultural products such as shrimp, bananas and plantains, flowers, tuna and cocoa, among the main products.

After consistent growth in its economy through 2017, Ecuador has been trying to bring its economy in line with a challenging international scenario using international financial institutions. In this context, the country promoted a reform program aimed at ensuring fiscal sustainability, strengthening the fundamentals of dollarization, boosting private investment and guaranteeing social protection for the most vulnerable populations. However, the fall in oil prices in early 2020 and the COVID-19 crisis brought new challenges. Social distancing measures, including a long national quarantine, led to a significant economic contraction, closure of thousands of companies, massive layoffs, unemployment and increased poverty, despite the government's efforts to prioritize public spending to address the health emergency and protect the most vulnerable groups. It is estimated that poverty will increase by 7 percentage points (from 25.7 to 32.7 percent) and extreme poverty will grow by 5.1 percentage points (from 7.6 to 12.7 percent). (ECLAC 2020). The GDP decreased by 9 percent in 2020 (ECLAC 2021).

Fiscal difficulties not only limited the authorities' ability to deal with the health crisis and its effects on the economy, but also deepened the fiscal imbalance. In this context, the authorities promoted a successful renegotiation of debt payments with international bondholders and China to reduce immediate financing needs. Ecuador has also managed to establish a new medium-term program with the International Monetary Fund, together with the support of other international financial institutions, to mitigate the effects of the crisis, restore macroeconomic stability, guarantee the sustainability of public finances, and strengthen institutions.

China is Ecuador's second largest trading partner after the United States. Ecuador's exports to China in 2019 were US$2,896 million (2.7 percent of GDP) and imports were US$3,724 million (3.5 percent of GDP). Ecuador will suffer a price effect due to the drop in commodity prices, but also a quantity effect given the slowdown in exports to the Asian country. The biggest impact on the economy could come from a drop in oil prices. A 10 percent fall in oil prices would generate a drop in GDP growth of approximately 0.84 percent (Goldman Sachs 2020).

Beyond the emergency, Ecuador still needs to complete structural reforms aimed at reducing vulnerabilities arising from fiscal imbalance, promoting investment to boost growth and quality employment, safeguarding and strengthening social protection mechanisms to protect the most vulnerable population, and improving access to opportunities for more inclusive development.

Peru

The Peruvian economy is based on the production and export of coffee, asparagus, blueberries, grapes, mangoes and cocoa, as well as fisheries and the exploitation of minerals (gold, copper, zinc, silver) and hydrocarbons.

It has experienced two distinctive phases of economic development since the turn of the century. Between 2002 and 2013, Peru was one of the fastest growing countries in Latin America, with an average GDP growth rate of 6.1 percent. Prudent macroeconomic policies and far-reaching structural reforms in the context of a favorable external environment generated a scenario of high growth and low inflation.

Strong employment and income growth reduced poverty rates steadily. The poverty rate (percentage of the population living on US$5.5 a day) fell from 52.2 percent in 2005 to 26.1 percent in 2013, or the equivalent of 6.4 million people moving out of poverty during that period. Extreme poverty (percentage of the population living on US$3.2 a day) decreased from 30.9 to 11.4 percent during the same period.

Between 2014 and 2019, GDP growth was slower, at an average rate of 3.1 percent per year. This was largely due to the fall in the international price of raw materials, including copper, the country's top export product. This led to a temporary reduction in private investment, lower tax revenues and a slowdown in consumption. However, two factors mitigated the impact of this external shock on GDP, which allowed the economy to continue growing, albeit at a slower pace. The first was the prudent management of fiscal and monetary policies and the exchange rate, especially during the economic boom. This allowed the country not only to withstand the fall in tax revenues without having to readjust spending significantly, but also to have sufficient international reserves for an orderly adjustment of the exchange rate. The second factor was the increase in mining production, as projects launched in previous years matured, which led to an increase in exports and counteracted the slowdown in domestic demand.

China is Peru's main trading partner. This country absorbs 32.7 percent of its exports, 85 percent of which are related to mining, although in recent years other products such as fishmeal (8.9 percent of exports) have gained importance. This composition is similar to that of Peruvian exports to Korea and Japan, which account for 4.8 and 4.3 percent, respectively, of the country's sales to the rest of the world. Peru's next most important trading partners are the countries of the European Union (13.4 percent of exports) and the United States (12.4 percent of exports), economies that are also heavily affected by the crisis. Agricultural products have a greater weight in exports to these countries. There is reason to believe that the elasticity of consumption of fresh products in Europe and the United States is relatively low, which implies that the impact of the shock of the crisis is relatively small. The impact of the shock on the agricultural sector will be more moderate.

Peru has been severely affected by the COVID-19 pandemic. A strict generalized quarantine led GDP to fall by 12.9 percent by the end of 2020. Results of the World Bank's household survey as of July 2020, reveal that the loss of jobs and sources of income was quite high in Peru and even more pronounced among the informal, self-employed and low educated sectors of the population. Job losses decreased in June and July. About 30% of respondents mentioned having lost their job in May, and about 15% stated the same in July 2020. At the end of July 2020, a higher proportion of men (74%) kept their jobs compared to women (53%). Also, income losses have been very high. By May, 80% of the households surveyed reported a decline in household income.[22]

The government has developed a comprehensive economic compensation and assistance program to protect the vulnerable population and support businesses. The program includes cash transfers, tax deferrals and credit guarantee for the private sector. However, the slowdown in economic activity will result in a substantial increase in poverty. Considering the depth of the recession in 2020, a strong rebound is expected by 2021 of as much as 9 percent, which presupposes an accelerated execution of public investment and better international conditions as a result of the implementation of a COVID-19 vaccine.

Going forward, the economy is expected to stabilize at rates close to those recorded in the pre-crisis period. The challenges for the Peruvian economy are to accelerate GDP growth, promote shared prosperity and provide its citizens with protection against shocks, whether of a generalized or individual nature. This will require enhancing the effectiveness of the state in providing public services and generating protection schemes, as well as providing better connectivity infrastructure and formulating policies to reduce rigidities in factor and product markets.

Venezuela

Venezuela's main export product is oil. Therefore, any variation in the price of this commodity has a significant impact on already declining exports revenues. Current projections for the price of oil could put the price of Venezuelan exports below their operating cost. China was one of the main destinations for Venezuelan oil exports, as part of the debt repayment scheme established between these two countries. It is unclear whether the Venezuelan political regime is currently paying China. Available information on Chinese imports from Venezuela is less than US$100 million. On the other hand, due to blockades and sanctions from countries opposed to the current government, China has become the main trading partner, with imports from this country doubling between 2018 and 2019. Currently, Venezuela does not have access to international financial markets. ECLAC estimates the Venezuelan economy contracted by 30 percent in 2020 and will contract another 7 percent in 2021.

Intermittent border closures with Colombia may reduce the availability of goods and foreign exchange, as a substantial proportion of remittances come from Colombia (based on press

[22] https://www.bancomundial.org/es/news/press-release/2020/09/08/crisis-por-el-coronavirus-aumento-las-desigualdades-en-el-peru

reports). Also, the unavailability of fuel for transportation may further damage the economy. The collapse of public service provision is evident. The health infrastructure is in a precarious situation. About half of the hospitals lack basic equipment. The overall health of the population has become precarious making them highly susceptible to the outbreak of COVID-19. In 2018, 25 percent of children presented with malnutrition and 64 percent of adults lost weight due to the crisis (2018 Survey of Living Conditions). Even more, diseases such as tuberculosis and measles, have seen a significant resurgence. As of 2019, these diseases have affected 400,000 people.

Table 7.10 Annual and per capita gross domestic product (GDP) (year 2019)

Country	GDP at current prices (US$ million)	GDP per capita at constant prices (US$ per capita)
Argentina	445,445.3	9,842.8
Bolivia	40,895.3	2,579.9
Chile	282,318.2	15,091.5
Colombia	323,616.0	7,838.2
Ecuador	107,435.7	5,097.1
Peru	227,423.8	6,486.6
Venezuela	--	4,211.6

Source: ECLAC: Economic Commission for Latin America and the Caribbean - Own estimates based on official sources.

7.5 Economic Trends

The key economic sectors that have had an impact on the natural ecosystems in the hotspot are agriculture, livestock, hydrocarbon extraction and mining, forestry and tourism. With respect to the economic categories shown in Table 7.11, both livestock and forestry are part of the agricultural sector, tourism is included in the commercial sector (hotels and restaurants) as well as the transport sector, and the mining sector includes quarrying to build roads, dams and other public works infrastructure.

Table 7.11 National Economic Profiles of the Hotspot Countries: 2019 Gross Domestic Product (GDP) by economic activity at constant prices (millions of dollars)

	Argentina	Bolivia	Chile	Colombia	Ecuador	Peru	Venezuela
Agriculture, livestock, hunting, forestry and fishing	32,464.6	3,127.5	9,548.5	24,707	9,433.4	13,550.1	---
Agriculture, livestock, hunting and forestry	*31,104.4*	*3,127.5*	*7,639.0*	*20,817.7*	*8,368.25**	---	---
Fishing	*1,343.1*	---	*1,843.8*	*532.6*	*575.82**	---	---
Mining and quarrying	14,188.2	3,097	36,916.4	28,185.2	8,148.1	23,807.4	---

Manufacturing industries	59,320.1	3,314.6	28,199.7	47,560.2	10,814.1	27,132	---
Electricity, gas and water supply	5,749.2	674.5	10,065.2	11,409.2	1,827.1	3,965.7	---
Construction	18,726.9	918.3	17,063.8	22,521.5	8,215.0	12,425.9	---
Wholesale and retail trade, repair of goods, and hotels and restaurants	58,563.1	2,784.2	31,725.1	46,033.5	10,677.2	30,237	---
Wholesale and retail trade, and repair of goods	50,243.8	2,102,5	---	32,460.1	---	---	---
Hotels and restaurants	8,554.2	681.4	---	13,530	2,414.31*	---	---
Transportation, warehousing and communications	29,313.1	2,673.4	25,383.0	30,836.6	7,669.7	20,941.6	---
Transportation and complementary and auxiliary activities	---	2,332.7	15,591.2	17,363.7	---	---	---
Mail and telecommunications	---	361.5	9,804.5	13,324.3	2,011.87*	---	---
Financial intermediation, real estate, business and renting activities	60,403.2	2,903.8	58,881.0	78,226.9	13,535	21,778.7	---
Public administration, defense, compulsory social security, education, health and social services, and other community, social and personal services.	92,893.2	5,165.7	42,917.6	66,444.3	14,105.6	39,533	---
Financial intermediation services indirectly measured (FISIM)	---	1,429.3	---	---	---	---	---
Total value added	368,061.9	23,432.2	261,815.4	358,671.1	85,418.6	193,174.6	---
Taxes on products minus Subsidies on products	72,717	6,951.1	24,180.9	35,881.9	3,039.4	17,716.3	---
Statistical discrepancy of GDP by sector of origin	-3,569.5	-478	1,132.7	2,764.8	1,090.2	-206.2	---

Gross domestic product (GDP)	440,769.2	29,702.8	286,013.8	394,571.1	88,554.7	210,881.6	116 067.8

Source: CEPALSTAT, 2020. Economic statistics and indicators. Annual national accounts in dollars.
Note: Data for Ecuador (*) taken from the statistical bulletin of the Central Bank of Ecuador (BCE 2020).

Agriculture

The diversity of agricultural production in the Andean countries is related to the variety of climatic zones, which include tropical, temperate, arid and cold. The tropical climate zone is found mainly in the Amazon River basin. Arid climates, both cold and extremely hot, are found in the coastal deserts and at elevations in the Andean interior. Although arid conditions make agricultural production difficult, irrigation has allowed crop plantations to expand in these areas (National Geographic 2019; Gestión 2019). The cold, dry climates are not optimal for agricultural production, but native species of potato and grains such as quinoa are grown there.

Agriculture is an important economic component in all hotspot countries. The sector contributed 7.6 percent of the Andean countries' GDP in 2017 and accounted for approximately 22 percent of jobs in Colombia, Ecuador, Peru, Bolivia, and Chile (range 11 to 30 percent). In fact, over the last decade, agricultural GDP growth (3.2 percent) was higher than total GDP (2.8 percent) (World Bank 2019).

Historically, Peru has been the world's leading producer of asparagus, avocado, and quinoa, while Ecuador leads in the production of cauliflower and broccoli, and Colombia is the leading producer of coffee, carrots and turnips. Maize, beans, lima beans and *melloco* are grown in all countries for subsistence purposes. Ecuador's production of quinoa, cauliflower and broccoli has grown rapidly (more than 20 percent annually), while Peru has also experienced high levels of growth (approximately 10 percent) in avocado, cocoa and quinoa production. The growing demand for these crops, with high nutritional value, particularly those such as quinoa (considered a "superfood"), in international markets explains the higher levels of production of these in the region (Malaga *et al.* 2019). Agro-industrial crops within the hotspot, with a clear orientation to external markets, include coffee, cocoa and flowers, especially in Ecuador and Colombia, as well as asparagus and grapes in Peru and Chile (OEC 2019).

In Colombia, commercial sugarcane plantations are established between 500 m and 1800 m above sea level, coffee between 800 m and 1800 m above sea level, and potatoes at 2,500 m above sea level and higher. The department of Huila has the largest area planted with coffee in Colombia, and the KBAs Serranía de las Minas (COL103) and Parque Nacional Natural Puracé (COL70) are located there. Fresh flowers grown in nurseries for export are planted in high valleys and in the highlands of Cundinamarca and Boyacá (Colombia), and traditional agriculture takes place along the altitudinal gradient. Coffee production is important in the Andean regions from Venezuela to Bolivia. For a long time, Colombian coffee has been an important product for domestic and export markets. The sector is dominated by small producers who grow shade coffee in diverse agroforestry systems or full-sun monocultures, although this variety has caused important levels of deforestation in the hotspot.[23] Avocado cultivation has also increased recently and affects some KBAs such as Páramos del Sur de Antioquia (COL59), Alto Quindío (COL6) or Cuenca del Río Toche (COL32), all of them located in the Cordillera Central.

[23] https://blogs.elespectador.com/economia/el-mal-economista/el-lado-oscuro-del-cafe
https://diarioresponsable.com/noticias/27806-el-cafe-un-arma-de-doble-filo-para-el-medio-ambiente-y-los-agricultores

More recently, high-altitude coffee grown by smallholderfarmers on the eastern and western slopes of the Andes of Ecuador, Peru and Bolivia has gained ground in export markets, particularly in niche markets such as organic, bird-friendly, fair trade and shade-grown coffee. Coffee production is a significant activity in areas close to corridors such as Paraguas-Munchique-Bosques Montanos del Sur de Antioquia (Colombia) and KBAs such as Parque Nacional Podocarpus (ECU50) and Abra Patricia-Alto Mayo (PER7), among others.

In the four Andean-Amazonian countries, cocoa cultivation in agroforestry systems and its transformation into single-origin chocolate has undergone an expansion aimed at specialized export markets. The growing demand for cocoa has stimulated a sustained increase in the area under cocoa cultivation. Between 2006 and 2016, it increased by more than 377,000 hectares. The increase in the area under cultivation in Latin America is concentrated in five countries: Ecuador, Colombia, Brazil, Peru and the Dominican Republic, which together have increased by around 354,000 hectares. Colombia and Peru have increased the area under cultivation by more than 100 percent when compared to 2006 (Sanchez et al. 2018). However, most of the cocoa-growing area is at lower elevations than those occurring within the hotspot.

Coca cultivation is a widespread activity in Colombia, Peru and Bolivia, which are the main producers globally, and negatively affects the conservation of KBAs. In some cases, it also generates violence and insecurity in nearby communities. In the national consultation workshops it was mentioned that the following KBAs are affected by this activity: Parque Nacional y Área Natural de Manejo Integrado Cotapata (BOL45), Cristal Mayu y Alrededores (BOL14), where poppy is also planted; Yungas Inferiores de Carrasco (BOL34), Kosñipata Carabaya (PER44), Previsto (PER74), Manu (PER60) and its buffer zone , Serranía de los Paraguas (COL106), Región del Alto Calima (COL80), Parque Nacional Natural Farallones de Cali (COL65), Parque Nacional Natural Munchique y extension sur (COL67), Serranía del Pinche (COL109) and Reserva Natural La Planada (COL88), the latter because of poppy cultivation.

7.5.1 Livestock

Livestock production in the hotspot consists mainly of beef and dairy cattle units, but also includes smaller animals (e.g., sheep, lambs, pigs, hens, rabbits and guinea pigs) and the domestic breeding of 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 for their meat for local consumption. Colombia is the region's leading producer of milk, chicken and beef, while Chile is the leading producer of pork.

Animal production, which is largely for domestic consumption, experienced a significant increase in chicken and pork production (average annual growth rates of 6 and 4.5 percent, respectively) from 2000 to 2016. Beef production had a very modest increase (1 percent), although most of the region's agricultural land (approximately 110 million hectares) corresponds to grasslands and permanent pastures (FAO 2019). Imports of animal products have also expanded. Thus, there has been growth in domestic production and imports to meet the increased demand for animal protein as the economy and household incomes increase.

Beef and dairy cattle make an important contribution to the economies of most hotspot countries, although the sector's share of greenhouse gas (GHG) emissions is also significant. In national inventories under the United Nations Framework Convention on Climate Change (UNFCCC), emissions of these gases from livestock are accounted for, for each country, within subcategories of the agriculture sector. These subcategories correspond to enteric fermentation, manure management, rice cultivation, agricultural soils, savanna burning and agricultural residue burning (or equivalent subcategories). In Bolivia, Colombia, Ecuador and Peru, enteric fermentation is the subcategory that contributes most to emissions from the agriculture sector and, therefore, also to livestock, since it comes entirely from this activity.

Cattle ranching in Andean countries has the exceptional characteristic of being carried out in high altitude sites, something that occurs in few production systems in the world (Reyes *et al.* 2018). Although the cattle population in these areas is variable, dairy production is quite important in local and export economies. Globally, livestock farming has been highlighted as a route out of poverty in the rural areas of developing countries. This is due to its contribution to food as a source of family income, its strategic dimension for sustainability and subsistence, given its contribution to human nutrition in general, and for being key to economic development.

Because of cattle ranching's key role in national economies and its role in the fight against climate change, all countries are implementing policies and programs aimed at improving the economic and environmental performance of their products. For example, in Argentina, organic beef certification systems are being implemented. In Bolivia, the Sustainable Development of Cattle Ranching Program is advancing In Chile, the program for the Conservation and Sustainable Use of the Patagonian Steppe for Sustainable Cattle Ranching is being implemented. In Ecuador, the Climate-Smart Cattle Ranching Program is being implemented, and in Colombia, the Sustainable Cattle Ranching Program is underway (ECLAC-FAO-IICA 2019).

7.5.2 Hydrocarbons and Mining

The largest reserves and the most representative fossil fuel producing countries in all of Latin America and the Caribbean are found in the Andes. Venezuela is the largest oil producer with 1.5 million barrels per day and ranks 13th in the world. In addition, with 303 billion barrels, Venezuela is the first country with the largest proven oil reserves in the world and holds the second-largest natural gas reserves in the Western Hemisphere (BP 2019). However, it is important to note that most oil and natural gas exploitation occurs in territories located outside the hotspot.

Table 7.12 Proven natural oil and gas reserves in the hotspot countries

Country	Oil		Natural gas
	Proven reserves (billions of barrels)	Daily production (thousands of barrels)	(share of global proven reserves)
Argentina	2.0	592	0.2 %
Bolivia	--	--	0.1 %
Chile	--	--	
Colombia	1.8	866	0.1 %
Ecuador	2.0	517	--
Peru	1.0	154	0.2 %

Venezuela	303.3	1,514	3.2 %

Fuentes: US Geological Survey, British Geological Survey © UKRI and World Mining Data.

Metal mining is an important sector for the economy of the countries, particularly hotspot countries. Global copper production has experienced a considerable upswing in recent years. In 2019 it reached 20 million metric tons, that is, about 25 percent more than the amount recorded in 2006. Chile remains by far the world's largest copper producer, although its production decreased in 2019 (5.60 Mt, down from 5.83 Mt in 2018). Chile also dominates copper reserves, with 200 Mt, compared to global total reserves reaching 870 Mt. Peru is the world's second-largest copper producer, with 2019 production of 2.40 Mt. Peru's reserves are estimated at 87 Mt. As for gold, Peru is among the world's top 10 producers, with 130 t per year and 2,100 tons of reserves.

Three of the ten copper mines with the highest capacity globally are located in Chile. In first place is the Escondida mine, located in the Atacama Desert on the edge of the hotspot, with a production capacity of 1.37 Mt in 2018. This was the largest copper mine in the world in 2019. In second position is the Collahuasi mining district, located in the Chilean section of the hotspot and with a production capacity of 570,000 metric tons.

In 2019, Ecuador reported the discovery of a subway mine with great potential for the exploitation of gold, copper, and silver. Due to its size, it would be included among the largest in the world. The "Cascabel" project, located in the province of Imbabura, has been classified as a Tier 1 deposit, these are very rare and scarce, but they contribute more than half of the world's copper production. Preliminary evaluations determine that the deposit called "Alpala", of the "Cascabel" project, could become the largest subway silver mine, the third-largest gold mine and the sixth-largest copper mine in the world ranking. The study estimates mineral reserves of 10.9 million metric tons of copper and more than 23 million ounces of gold. The mine is located in the Awá-Cotacachi-Illinizas Corridor.

According to U.S. Geological Survey (USGS) data for 2019, Chile and Argentina accounted for 71 percent of total world reserves of lithium in 2018. At the resource level available, Chile, Argentina and Bolivia account for 52 percent of this mineral, forming what has been called the lithium triangle (Poveda 2020). Most recently, Peru reported in 2018 that the Canadian company Plateau Energy Metals had discovered lithium reserves of around 2.5 million metric tons in the Andean locality of Macusani, department of Puno, at 4,500 m above sea level and 1,402 km southeast of Lima, on the border with Bolivia. This area isclose to the Cordillera Carabaya KBA (PER27).

In 2018, Bolivia reported that a study conducted over 64 percent of the Uyuni salt flat, located at 3,650 m above sea level, in the Daniel Campos province of Potosi, within the Altiplano region of the Andes Mountains, revealed the existence of a geological reserve of 21 million metric metric tons of lithium.[24] These findings, while promising in terms of the revenue potential they could generate for the countries' economies, also represent enormous challenges in terms of achieving responsible use of these mineral reserves, without generating irreversible impacts on the dynamics of the natural systems of the KBAs and nearby corridors that could be affected, such as the Saline Lakes Corridor of the Chilean/Bolivian Altiplano.

[24]https://www.icex.es/icex/es/navegacion-principal/todos-nuestros-servicios/informacion-de-mercados/paises/navegacion-principal/noticias/NEW2019811187.html?idPais=BO#:~:text=The%20executive%20director%20of%20de%20Fields%20of%20metric tons%20of%20m%C3%A9trical%20lithium%20.

Mining exploitation has had diverse social and environmental implications. The University of Arizona conducted a mapping of extractive industries (mining and hydrocarbons) in the region, which identified at least 226 socio-environmental conflicts in indigenous territories during the period between 2010 and 2013 (Del Popolo 2017). In Colombia alone, in 2013, out of 73 socio-environmental conflicts identified, 23 were located in indigenous territories (Pérez-Rincón 2014). In 2017, 22 mining concessions affected 5,677,366.51 hectares of indigenous reserves. In Chile, the National Human Rights Institute reported 102 conflicts, 39.2 percent of which involved indigenous territories, mainly associated with extractive mining projects of national and transnational companies and energy projects (INDH 2015). In 2015, a total of 64 conflicts were reported by OCMAL (2016) in Colombia, Ecuador, Peru and Bolivia (ECLAC 2020).

Gold mining has negative environmental impacts or threatens KBAs in all hotspot countries (see Chapter 6), as they all have significant gold reserves. The explosive growth of gold mining has been driven by the increase in ore prices (Figure 7.1), which in turn has recently been boosted by the COVID-19 pandemic: in the face of economic uncertainty, investors seek safe haven securities such as gold.

Figure 7.1 International gold price (US$/oz) 2010-2020

Fuente: https://www.preciooro.com/cotizacion-oro.html#:~:text=16.11.2020.,oro%20de%20hoy%20en%20d%C3%B3lares.&text=El%20lunes%20a%20las%2016,en%20el%20cierre%20del%20viernes.

7.5.3 Forestry

In most hotspot countries, forestry is an economically important sector that generates socio-environmental benefits and impacts. Most of the remaining natural forests with forest species of high commercial value occur in the most productive Amazonian regions (Venezuela, Colombia, Ecuador, Peru and Bolivia) and Chocó (Colombia and Ecuador) and, to a lesser extent, the temperate rainforests (Chile). For this reason, most large commercial logging operations in these countries operate outside the Tropical Andes Hotspot.

Within the hotspot, small-scale activities predominate, often informal or illegal, to meet the demand of domestic markets. Despite regulatory and public policy advances, high levels of informality and unsustainable forestry practices persist, usually resulting in forest degradation that affects virtually all KBAs with forests between 500 m and 2,000 m above sea level in the hotspot. Between 2001 and 2019, the net loss of forest cover in the hotspot was estimated at around 4 million hectares (see Chapter 6). In Ecuador, for example, owners of relatively small areas of forest are usually the informal forestry actors. They either sell their standing trees to logging operations or sell their logs and planks at local markets, driven mainly by middlemen. In this country, there has been traditionally 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.

Forest certification is an important tool for reducing informality and promoting good forest management practices. The Forest Stewardship Council (FSC) provides a connection between the forest and the consumer by ensuring the greatest social and environmental benefits. Around the world, there is a growing niche market for certified wood products, which is mainly exploited by a growing responsible forestry industry in the region. The FSC system offers procedures for small producers and indigenous communities that seek to encourage formality: 1) the continuous improvement process, which promotes responsible forest management and certification as a five-year path to formality; 2) payment for ecosystem services, which proposes co-responsibility with companies in sectors other than timber to contribute to the conservation of water, soil, biodiversity, carbon capture and tourism services; and 3) the certification of conservation areas to identify the shared values of territories that hold cultural and natural heritage as new ways of conserving territories. Although FSC certification is not a financial incentive, and the process is costly, especially for small operations, there is a trend towards certification in the hotspot. All hotspot countries currently have at least one FSC-certified forestry operation, in native forest management, forest plantations, chains of custody and other programs that favor sustainable forest management.

Plantation forestry covers about 2.2 million hectares in central Chile, but all are 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 reforesting the yungas and establishing environmentally sustainable forest plantations for production (AFORSA undated, Balducci *et al.* 2009). Other countries have forest plantations within the hotspot in smaller areas. Ecuador and Peru, for example, have wood industries based on pine plantations (*Pinus radiata* and *P. patula* and other introduced conifer species) in the Andes that are certified, ensuring that there is no change in land use and with mandatory compliance with the definition and development of strategies in their management plans to ensure high conservation values. The KBAs Río Utcubamba (PER84) and Finca la Betulia Reserva la Patasola (COL37) are affected by pine plantations.

In addition to industrial plantations, social forestry ventures, such as agroforestry aimed at meeting the basic needs of communities and improving their well-being, are common in the hotspot. In Colombia, for example, native bamboo forests, *Guadua angustifolia*, grow between 900 m and 2,000 m above sea level in the hotspot adjacent to the KBA Serranía de los Paraguas (COL106) in the coffee-producing region. The sale of guadua stems in national and international markets generates income for rural communities (Arango *et al.* 2010). Associations of guadua producers in Colombia (e.g., Asoguadua, Asobambú and Fundaguadua) and of balsa and other tropical forest timbers in Ecuador (e.g., Allpabambu and Verde Canandé) could be important partners in conservation activities in the hotspot.

Among the relevant stakeholders are the subnational governments, which can draw up guidelines for a landscape vision that prioritizes the zoning of areas for conservation, sustainable use and food security purposes, but also for responsible consumption and also for public procurement decisions that prioritize certified products for public infrastructure, for example. Generating commercial links that shorten market circuits is one of the challenges to producing greater utility in the prices of timber and non-timber forest products with added value in an inclusive economic environment. The need creates demand for academia to investigate native species of high commercial value, as well as the applications of new species and the development of products that can generate complementary opportunities to species that are commercially in demand.

7.5.4 Tourism

Tourism is one of the largest contributors to Latin America's GDP. The region's gross domestic product was estimated at approximately US$5.7 trillion in 2019, and the travel and tourism industry contributed nearly US$400 billion that year, which is approximately 7 percent (WTO 2020). Through 2019, the World Tourism Organization (UNWTO) determined a 3 to 4 percent growth in GDP in Latin America (this measure is based on the number of international tourists arriving), and the sector accounted for 10 percent of total exports (goods and services) and 10 percent in labor (UNWTO 2019).

However, the reality changed in 2020 due to COVID-19, as tourism was one of the most affected economic sectors in Latin America due to COVID-19. According to ECLAC (2020), the fall in this sector could lead to a decrease in GDP growth of at least 1 to 2 percent in the employment rate in the region by the end of the year. International tourist arrivals globally will be reduced by between 58 percent and 78 percent due to the pandemic.

In Argentina, according to the National Institute of Statistics and Census (INDEC by its acronym in Spanish), in 2019 the number of international tourists entering the country grew by 11.1 percent over the 2018 total. In that year, Argentina rose to seventh place among the countries that grew the most in the world in tourism activity. But in 2020, there was a year-on-year decrease of 98.9 percent for the tourism sector overall, and the hotel sector had a decrease of 97.4 percent due to COVID-19. The travel and tourism sector's total contribution to GDP in Argentina as of 2019 was US $51.7 billion, 10 percent of the country's GDP, and 3.5 points higher than in 2012 (CEPF 2015). In terms of tourism in protected areas, more than 4million domestic and foreign tourists visited protected areas in 2019 (Administración de Parques Nacionales/Sistema de Información de Biodiversidad 2019).

For Bolivia, tourism is one of the most sustainable activities; between 2008 and 2017, it managed to double the tourist flow in the country, although the figures are still low in the regional context. In 2018, according to the Bolivian Institute of Foreign Trade (IBCE by its acronym in Spanish), the arrival of foreign tourists to Bolivia was 1,141,860 (representing 3 percent more compared to 2017). In 2019, on the contrary, tourism decreased by 2 percent compared to 2018. For the first half of 2020, Bolivia recorded 7 percent fewer international visitor arrivals compared to the previous year, according to the National Institute of Statistics (INEby its acronym in Spanish). This phenomenon was mainly due to COVID-19, but also to political instability during 2019.

As for nature tourism, until 2015 in Bolivia, the activity was still incipient and was aimed mainly at backpackers with limited budgets. Up to that date, the Uyuni salt flat, in the departments of Potosí and Oruro and part of the Lagos Salinos del Altiplano Chileno/Boliviano Corridor was the leading tourist destination; the other was the Parque Nacional Madidi (CEPF 2015). By 2020, the trend had not changed, but Bolivia now has new tourist destinations. An example of this is the Bosque de Polylepis de Taquesi KBA (BOL8), on the Takesi (pre-Columbian road) route near La Paz, which was supported by CEPF in Phase II. In this KBA, not only have ecotourism activities been implemented, but this activity has been the driving force in empowering women and promoting gender equity in the area. It has also contributed to the conservation of biodiversity (since there are forests and birds in danger of extinction) and to the revaluation of heritage and culture. This KBA is also designated as an Important Area for Birds and Biodiversity (IBA) (A1, A2), which also gives it great potential for birdwatching. The Parque Nacional Tuni Condoriri KBA (BOL46) receives a large influx of climbers eager to ascend Huayna Potosí, possibly the most climbed 6,000 m peak in the world. Totoroto, in the Cuencas de Ríos Caine and Mizque KBA (BOL16) is famous for its dinosaur footprints and spectacular geological formations.

In Chile, according to the Undersecretary of Tourism, 21.1 percent fewer tourists were registered in 2019 than in 2018, a figure that largely responds to the decrease in Argentine tourists due to the adverse economic situation faced by that country. Chile is one of the most preferred destinations for Argentines but in 2019 had 40.7 percent fewer visitors from Argentina compared to 2018). According to the latest figures published by INE, as of July 2020, a significant decrease of tourists (12 percent) was observed because of COVID-19.

In relation to nature tourism developed in protected areas in Chile, and which has domestic tourists as its main public, for the period 2015 to 2020 there is evidence of a significant growth in the number of visitors. In 2018, 2,689,190 visits to different areas of the National System of Wildlife Protected Areas (SNASPE by its acronym in Spanish) were recorded, and in 2019 it grew to 3,523,447 (CONAF 2020). The increase is due to the fact that a good part of ecotourism is concentrated in Antofagasta (outside the hotspot), where Los Flamencos National Reserve is located, a place with great potential for this type of tourism (Rivas-Ortega 2018). Up to 2015, it had already been recorded that the community of San Pedro de Atacama (within the hotspot), in the high arid plateau in the Andes Mountains of northeastern Chile, received significant public-private investment for its development and promotion (CEPF 2015).

In Colombia, according to the Ministry of Commerce, Industry and Tourism, the number of tourists during 2018 bordered 4.3 million visitors (equivalent to a growth of 10.4 percent versus 2017). In 2019, the number of non-resident visitors arriving in the country was 4,515,932, with a growth of 2.7 percent compared to 2018. For the first half of 2020, nonresident visitors fell 99.2 percent from 2019 due to COVID-19. This sector's share accounted for only 2 percent of GDP, declining 0.8 points from the 2015 hotspot ecosystem profile (CEPF 2015).

In Colombia, there are many tourist attractions. One of them is the Eje Cafetero, which is an important and well-promoted destination for both national and international tourism. This area includes KBAs such as Cañón del Río Combeima (COL15), Reserva Natural Ibanasca (COL87) or Alto Quindío (COL6). Up until 2015, cultural, archaeological and ecotourism options in the Colombian Andes were often developed in response to the social conflict present in that country. Until that year, the community-based Serraniagua Corporation was the only such group to offer a coffee tourism and ecotourism product in the coffee-growing region of Serranía de los Paraguas (COL106) in the Western Cordillera. In Sierra Nevada de Santa Marta, activities related to culture and protected areas were promoted (CEPF 2015). According to Parques Nacionales Naturales of Colombia in its annual report, tourism grew in by 5.1 percent in the country’s protected areas compared to 2018, and 16.4 percent compared to 2017.

In 2020, this tourism offering was complemented by the birding route of the western Andes in the Paraguas-Munchique-Montane Forest Conservation Corridor of southern Antioquia led by the Calidris Association with funding from CEPF in the KBAs of Valle del Cauca: Serranía de los

Paraguas (COL106), Alto Calima Region (COL80) and Bosque de San Antonio/Km 18 (COL7). This project was complemented by another being developed in the same area, which aimed at empowering bird guides and local communities along the bird watching route. Within this framework, conservation agreements have been formulated and implemented through community projects that seek to protect birds and biodiversity through environmental education, restoration of native vegetation, and community bird monitoring.

In Ecuador, in 2019, the average annual arrival of foreign travelers to Ecuador grew by 4 percent over 2018, according to the Ministry of the Interior´s Migratory Registry. And according to the Central Bank of Ecuador, between 2015 and 2019, tourism contributed to the country, on average, 1.9 percent of the national GDP (US $490 million). Ecuador is one of the hotspot countries with the largest number of protected areas in its territory, a potential that, according to the Ministry of Environment and Water (MAAE by its acronym in Spanish) has allowed the visit of a significant number of tourists: from 2015 to 2019 this figure bordered 2 million visitors, between nationals and foreigners (MAAE 2020).

The Ecuadorian ecotourism industry in the Tropical Andes and high Amazon, continues to grow. CEPF has made some investments to finance initiatives by local CSOs. In 2015, birdwatching activities were developed in the northern part of the hotspot, in Mindo y Estribaciones Occidentales del Volcán Pichincha (ECU44) and Los Bancos-Milpe (ECU41) where the Mindo Cloudforest Foundation (MCF) bird sanctuaries are located (CEPF 2015). And between that year and 2020, other initiatives were added such as the Corporación Microempresarial Yunguilla (CMY) and the NGO Aves y Conservación. CMY works in the Maquipucuna-Río Guayllabamba KBA (ECU43) promoting productive activities and experiential tourism. Aves y Conservación promotes participatory conservation of the black-breasted puffleg (*Eriocnemis nigrivestis*) in the Intag-Toisán KBA (ECU34). This CEPF project, which is not directly related to avitourism, together with other partners, promotes productive community enterprises and ecotourism activities in the area.[25] Subsequently, when updating the Action Plan for this species in 2020, the recommendation to develop birdwatching and nature tourism activities in this KBA and in the Los Cedros Protected Forest (ECU14) was followed as a key tool for conservation (Juan Carlos Valarezo pers. comm.h).

In Peru, according to the Ministry of Foreign Trade and Tourism (MINCETUR by its acronym in Spanish), tourism growth in 2018 was 9.6 percent over 2017. But in 2019, it grew just 1 percent, which meant eight percentage points less than in 2018 (the lowest value recorded in the last 17 years). However, and despite these figures, according to the Central Reserve Bank of Peru, inbound tourism generated US$3,904 million, in foreign exchange income, a figure that meant an increase of 6.7 percent compared to 2018, placing tourism in 2019 in the third position as a generator of foreign exchange. Tourism activity in Peru contributed around 4 percent to GDP in 2019 (4 points less compared to 2012), and generated an average of 1.1 million jobs. Regarding tourism in protected areas, according to the National Service of Natural Areas Protected by the State (SERNANP by its acronym in Spanish), Peru recorded more than 2.5 million tourists visiting these sites during 2019, which represented a 14 percent annual increase since 2015 (Peruvian News Agenda 2020).

As in 2015, tourism activities in Peru are currently centered on a) cultural tourism associated with Inca and pre-Inca architecture and archaeological ruins and other national monuments (e.g., Machu Picchu); b) ecotourism and nature tourism generally associated with public and private protected areas; and c) extreme sports such as mountain climbing, mountain biking

[25] http://avesconservacion.org/web/portfolio/conservacion-participativa-del-criticamente-amenazado-zamarrito-pechinegro/

and canoeing (CEPF 2015). However, ecotourism activities have diversified in the hotspot, with CEPF funding in some cases. By 2020, an ecotourism and marketing plan was developed for the Amazon Biodiversity Conservation Initiatives Network (RED DBA by its acronym in Spanish), in the Northwestern Corridor of Peru where the Abra Patricia-Alto Mayo (PER7), Cordillera de Colán (PER28), Río Uctubamba (PER84) and Abra Pardo de Miguel (PER6) KBAs are located. With CEPF funds, a participatory strategic plan for tourism promotion and development and a network of tourism operators and enterprises was created and executed for the Vilcanota Cordillera Corridor (KBA Kosñipata-Carabaya, PER44). This initiative was undertaken by the NGO Ayuda para Vida Silvestre Amenazada (Help for Endangered Wildlife) and the Frankfurt Zoological Society.

In Venezuela, tourism is the third-largest revenue source after oil and tax collection, making it a truly significant socioeconomic and cultural boost for the country. According to World Travel and Tourism Council (WTTC), the contribution of the tourism sector to the Venezuelan GDP during 2018 stood at US$6,392 million, 34.4 percent less than 2017, and 81 percent less than 2013.

In general terms, tourism, ecotourism and tourism specializing in bird and nature watching are important activities for the promotion and maintenance of the biodiversity of the KBAs and hotspot corridors. This is because they directly or indirectly contribute to: 1) the improvement of the quality of life of many vulnerable communities (they are a source of income that allows them to prosper); 2) the improvement of self-esteem; 3) the revaluation of work within the community; 4) the rescue of native products; 5) organizational strengthening; 6) gender equity; 7) generational relay and 8) the conservation of natural resources.

Finally, according to the *Global Wellness Institute*, the global trends and needs for the next 10 years in terms of tourism in general (this also applies to hotspot) and nature tourism in particular, can be summarized as follows:

a) There will be an increasing number of conscious travelers in search of wellness. Wellness tourism growth is projected to double that of overall tourism, reaching US$919 billion in 2022 in Latin America, and is estimated to grow by 9.5 percent through 2022 in the Latin American region.
b) Technology will help make the journey easier throughout the entire experience.
c) More and more services will be required to meet the expectations and needs of the adventure traveler.
d) Experiences will be required in novel, natural and little-explored destinations. The trend is to generate the least impact on destinations, especially natural ones.
e) More and more community experiences and networking will be required to achieve this. Experiences will tend to be collective rather than individual.

Recommendations from the profile consultations focus on considering the need to develop a more sustainable tourism industry that can cope with new tourism flows without compromising natural and cultural resources or the quality of life of hotspot host communities. This includes capacity building and environmental awareness and interpretation activities. Another important aspect discussed was to further link the sustainable management of protected areas to the development of nature tourism as an effective economic response for indigenous and peasant communities living in or near protected natural areas.

8 POLITICAL CONTEXT OF THE HOTSPOT

8.1 Political Conditions and Trends

The following analysis provides an overview of the political situation, initiatives and agreements for natural resource management within the region's political trends. This analysis is based on the review of official documents, inquiry and research of specialists, individual interviews, and expert contributions at the national consultation workshops carried out during the elaboration of the ecosystem profile update.

8.1.1 Political Context in the Hotspot

During the last 15 years, the Andean region has experienced important changes and transformations, although with particularities in each country. These changes include the continuity of democratic governments, which contrasts with periods of strong political instability. Likewise, significant economic growth and availability of economic resources by national governments and society have facilitated social mobility, the widening of the middle class and the generation of inclusive social policies. With respect to inclusive policies, some countries with a progressive orientation have emphasized education, health and social welfare programs, which has led to significant improvements in social indicators.

However, this general situation started to change in 2015, with the problems derived from the instability of prices of raw materials such as gas, oil, copper and agricultural export products (IDB 2019). The economic situation of hotspot countries, in the internal and external markets, deteriorated between 2018 and 2019, and became more acute in 2020 due to the effects of the COVID-19 pandemic. In parallel, since 2016, social and political conflicts in several countries have been escalating, while a trend towards political polarization of societies has been gaining ground. This trend has also manifested itself in regional political alignments that have strongly affected different regional integration mechanisms.

A climate of distrust in political systems and their institutions (parliaments, political parties) has also been deepening and as has been distrust in democracy as a form of government that allows solving the structural problems of societies (OECD 2020). In 2010, support for the democratic system by the population was 61 percent and in 2018 it dropped to 48 percent, particularly among young people who question the growing inequality and privileges in certain sectors of society (Latinobarómetro 2018).

Undoubtedly, distrust in institutions and the need for structural changes that improve the quality of life of the population while generating inclusive economic and political systems, have been the common denominators in a wave of social protests across the region that surged in the last quarter of 2019.

Many of the countries in the region have had electoral processes since late 2020: presidential and parliamentary in Bolivia (October 2020); parliamentary in Venezuela (December 2020); presidential and parliamentary in Ecuador (February 2021), presidential and parliamentary in Peru (April 2021), presidential and parliamentary in Chile (November 2021). Thus, the political landscape may change, although no breakdowns that could affect democratic stability or essential aspects of sustainable development policies, biodiversity conservation, natural resource management or climate change commitments, are foreseen.

Several relevant events since 2016 have helped shape current conditions in the region and need to be taken into consideration:

a) *The peace process in Colombia and the agreement signed between the government and the Revolutionary Armed Forces of Colombia (FARC) guerrillas (2016).* This process complements the demobilization of the so-called self-defense groups since 2000. It is, however, an unfinished effort that is questioned and threatened by political groups and strong economic interests operating in the illegal spheres of the economy, particularly those linked to drug trafficking, illegal gold mining and corruption. The stability of peace in Colombia is a determining factor for the country's development and has a major regional impact due to Colombia's geopolitical influence in the northern Andes.

b) *The COVID-19 pandemic and its effects on the economy and the upcoming electoral processes.* According to several specialists, the region could be facing a new "lost" decade like that of the 1990s, with a sharp decline in social indicators, with growing unemployment and underemployment, a decrease in GDP and a probable increase in poverty and extreme poverty (IDB 2020). This could contribute to social conflict and a decrease in national budgets for rural development, biodiversity conservation and initiatives related to climate change management. In its April 2020 special report, the Economic Commission for Latin America and the Caribbean (ECLAC) stated that the 2020 crisis in the region, with a 5.3% drop in GDP, will be the worst in its history. To find a contraction of comparable magnitude, it is necessary to go back to the Great Depression of 1930 (-5%) or even further back to 1914 (-4.9%)" (ECLAC 2020).

8.1.2 Socio-Environmental Conflicts and Insecurity

The main and common security problems in the region are related to domestic violence and theft, which are aggravated by the deterioration of employment conditions and the economic well-being of the population. The countries that are above subregional averages in terms of homicide rates are Colombia and Venezuela, while other countries have achieved stable levels in this indicator, as shown in Table 8.1.

Table 8.1 Annual Homicide Rate (homicides per 100 thousand inhabitants)

Country	2016	2017	2018
Argentina	6.0	5.2	5.3
Bolivia	6.2	----	----
Chile	3.4	4.2	4.4
Colombia	25.7	25.0	25.3
Ecuador	5.8	5.8	5.8
Peru	7.9	7.9	----
Venezuela	59.6	49.9	36.7

Source: UNODC, 2019 report; https://dataunodc.un.org/

Unfortunately, violence continues to be a recurring theme in Colombia. In the last two years, there have been reports of murders of more than 200 social leaders, environmental activists and human rights defenders, as well as demobilized ex-combatants.[26] In 2020, a UN report identified 33 massacres (133 people killed) in the country up to August 17. Between that date

[26] https://cnnespanol.cnn.com/2020/07/29/asesinan-a-212-activistas-ambientales-en-2019-colombia-el-pais-mas-letal/

and September 8, there were at least four more massacres (15 people killed) in the departments of Cauca, Nariño, Antioquia and Bolivar. Violent groups are also active in the north of Santander and Urabá regions as well as the Llanos Orientales and the Amazon. Between January 1 and December 31, 2019, more than half of all reported killings and forced disappearances of land and environmental defenders globally occurred in two countries, Colombia and the Philippines. Colombia saw a sharp increase in the number of deaths, with 64 defenders killed in 2019. This is more than twice the number of killings that occurred in 2018 and the highest number ever recorded in the country (Global Witness 2020).

Among the people killed were leaders of the Great Awá Family, whose territory is located along the border between Colombia and Ecuador and contains two KBAs where CEPF has been working in recent years: Territorio Étnico Awá y Alrededores (ECU70) and Reserva Natural La Planada (COL88). In fact, the most recent attack was registered in September 2020, in the Inda Sabaleta reservation, located in Tumaco, department of Nariño, in southwestern Colombia.[27]

In addition to the human tragedy that the acts of persecution and violence cause, they are also an important challenge for the conservation of these highly biodiverse territories, as they make it difficult for civil society organizations to work in a safe environment.

According to some analyses, Colombia has not been able to resolve four structural issues that are at the root of violence: a) problems related to land misappropriation. Since the 1990s alone, an estimated 6.6 million hectares have been dispossessed by violent groups; b) the persistence of illegal activities such as drug trafficking and illegal gold mining; c) institutionalized corruption; and d) a political system that still needs to strengthen mechanisms for citizens and civil society organizations to participate in government decisions.
Venezuela presents a different scenario of violence and displacement. Political conflict and demonstrations for and against the current government were particularly important between 2016 and the first half of 2019, with the self-proclamation of the President of the National Assembly as President of the Republic. For its part, a Venezuelan NGO puts the homicide rate at 81.4 per 100 thousand inhabitants in 2018.[28]

In Chile, Bolivia and Ecuador, the cases of violence reported are related to specific events linked to the 2019 social and political protests and allegations of use of excessive violence by police forces.

With regard to the socio-environmental conflicts associated with extractive projects, there are two main drivers of conflict: 1) the limited guarantees of indigenous peoples' territorial rights, and 2) the limited government capacity to carry out prior consultation processes aimed at obtaining free, prior and informed consent. It is difficult to quantify the conflicts arising from the impact of indigenous peoples' territorial rights violation. However, a recent ECLAC report (2020) indicates that between 2015 and the first half of 2019, 873 conflicts were recorded in hotspot countries. These conflicts were mainly caused by mining and oil projects, at either the exploration or exploitation stage.

These data are consistent with those presented in a recent study led by the Foundation for Conservation and Sustainable Development (*Fundación para la Conservación y el Desarrollo*

---

[27] Published in El Comercio Newspaper, https://www.elcomercio.com/actualidad/masacre-pueblo-awa-colombia-ecuador.html.

[28] https://www.infobae.com/america/venezuela/2018/12/28/venezuela-fue-el-pais-mas-violento-de-america-latina-en-2018/

Sostenible - FCDS) conducted specifically in the Tropical Andes Biodiversity Hotspot biological corridors, with the support of CEPF. This study concludes that, "...environmental leadership in this region is the most vulnerable due mainly to the mining wealth of these territories" (FCDS 2020). It also presents the data collected by the *Tierra de Resistentes* Project, which reports episodes of violence between 2009 and 2019 for Colombia (225 cases), Peru (36 cases), Ecuador (59) and Bolivia (21) (FCDS 2020).

As mentioned before, the criminalization of indigenous social protests against investment projects that affect their territories has become a generalized practice. Thus, the repression, prosecution and assassination of environmental leaders has increased, as have conflicts over the use of water, between local populations and mining companies, and the expansion of the agricultural frontier for extensive plantations, export crops or biofuel production. Such conflicts are occurring, for example, in Intag-Toisán (ECU34) in Ecuador and in Tía María in Arequipa, Peru.

8.1.3 Challenges in Regional Integration

At the regional level, international political and economic integration presents few advances and serious challenges. Over the last decade, the hotspot countries have intensified their economic integration through a series of strategies and mechanisms such as regional trade agreements, including free trade agreements, customs unions and common markets (Table 8.2). The nature of these strategies and their level of implementation depend on the political agenda of each country and the geopolitics of the region. Regional integration processes had a very significant momentum until 2016, when political conflicts within the region, particularly in relation to Venezuela's situation, and changes in government slowed down the pace of progress in these processes and the institutional mechanisms of integration.

Among the integration processes, the Andean Integration System (*Sistema Andino de Integración)* and its main structures stand out due to its seniority and permanence. Such structures include: health (*Organismo Andino de Salud - Convenio Hipólito Unanue*), financial reserves (*Fondo Latinoamericano de Reservas*), financing (*Banco de Desarrollo de América Latina*), higher education (*Universidad Andina Simón Bolívar*), Court of Justice and the Andean Community of Nations (*Comunidad Andina de Naciones* - CAN), among others. This process has advanced with the participation of four countries, Bolivia, Peru, Ecuador and Colombia, which have basically placed emphasis on customs processes aimed at creating a free trade zone that, in recent years, comprised regulations related to electricity, mining (Andean observatory), migration and control of cultural heritage.

As of 2018, several organizations have lost strength in regional integration processes. This is the case of the Community of Latin American and Caribbean States (*Comunidad de Estados Latinoamericanos y Caribeños* - CELAC) and the Bolivarian Alliance for the Peoples of Our America (*Alianza Bolivariana por los Pueblos de Nuestra América* - ALBA) which, due to the changes of progressive governments that promoted them, have weakened to the point of disappearing. A similar situation occurred with the Latin American Integration Association (*Asociación Latinoamericana de Integración* - ALADI), which aimed at political and economic coordination towards a common market in Latin America. All hotspot countries are members; however, ALADI's influence has diminished with the establishment of other international forums. The CAN, a key body for regional political and economic integration, has lost all dynamism. Something similar has happened with Mercosur as a result of the political crisis in Venezuela in recent years, the radical nationalist policies in Brazil, the contraction of

Argentina's economy and internal political differences. However, it maintains its structure and dynamics with member and associate countries.

Possibly, the most significant change in recent years has to do with the dissolution of the Union of South American Nations (*Unión de Naciones Suramericanas* - UNASUR), after most countries exited the union in 2018: Argentina, Brazil, Chile, Colombia, Ecuador, Peru, Paraguay and, subsequently, Uruguay following its change in government. This has called into question the future of regional integration. UNASUR was one of the most important integration mechanisms in South America that made significant progress on several relevant issues: security, defense, infrastructure, energy, conservation, education, free mobility of people, investments in the Initiative for the Integration of South American Regional Infrastructure (*Iniciativa para la Integración de la Infraestructura Regional Suramericana* - IIRSA), etc. The causes of the dissolution of UNASUR may be internal, such as the slowdown of commitments, consensus approval mechanisms, among others but the main cause is political.

However, other integration bodies were formed, such as the Lima Group (2017). In the same way, the Forum for the Progress and Development of South America (*Foro para el Progreso de América del Sur* - PROSUR) was constituted in 2019, under the auspices of the governments of Chile and Colombia. The first summit was held on March 22, 2019 in Chile with the participation of Colombia, Ecuador, Peru, Brazil, Paraguay and the host country, and in March 2020, Uruguay joined. However, this mechanism did not develop the expected dynamism, as it is practically paralyzed after the surge of social conflicts in several of its member countries at the end of 2019. Another trade integration mechanism is the Pacific Alliance, which incorporates Chile, Peru and Colombia in the region. Ecuador is in the final stages of acceptance.

The most relevant integration mechanism in the design and execution of environmental policies and programs, specifically for the conservation of the Amazon biome, is probably the Amazon Cooperation Treaty Organization (*Organización del Tratado de Cooperación Amazónica* - OTCA), made up of Bolivia, Brazil, Colombia, Ecuador, Guyana, Peru, Suriname and Venezuela. At the end of 2019, a global alert was activated in the face of alarming signs of destruction of the Amazon rainforest, reflected primarily in forest fires that destroyed nearly three million hectares of forest. In response to this crisis, seven of the eight OTCA member countries adopted the "Pact of Leticia". Subsequently, in the framework of the 25th United Nations Climate Change Conference - COP 25 (Madrid, December 2019), the Action Plan of the Pact of Leticia for the Amazon was adopted as an operational instrument for the, still pending as at November 2020, implementation of this agreement.

Table 8.2 Hotspot Countries that are Parties to Regional Economic and Political Integration Agreements

Country	CAN	OTCA	Pacific Alliance	ALADI	MERCOSUR
Argentina	Not a member	Not a member	Not a member	Member	Member
Bolivia	Member	Member	Not a member	Member	Ratification in process
Chile	Not a member	Not a member	Member	Member	Associated State
Colombia	Member	Member	Member	Member	Associated State

Ecuador	Member	Member	Associated State	Member	Associated State
Peru	Member	Member	Member	Member	Associated State
Venezuela	Not a member	Member	Not a member	Member	Member

ALADI = Latin American Integration Association; CAN = Andean Community of Nations; MERCOSUR = Southern Common Market; OTCA = Amazonian Cooperation Treaty Organization.

8.2 Overview of Public Policies for Conservation in the Hotspot

8.2.1 Global and Regional Conservation Agreements

All hotspot countries have ratified the main international environmental treaties. These include the United Nations Framework Convention on Climate Change (UNFCCC), the Convention on Biological Diversity (CBD) and its Protocols, the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), the Convention on Wetlands of International Importance (Ramsar), and the Convention Concerning the Protection of the World Cultural and Natural Heritage (Table 8.3). Countries have also signed on to several Memoranda of Understanding under the Convention on Migratory Species, including one on migratory grassland birds and their habitats (Bolivia and Argentina) and one on 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 8.3 Hotspot Countries that are Parties to Global Environmental Agreements

Country	**Environmental Agreements**									**Number of Agreements**
	CBD	CITES	CPB	UNFCCC	UNFF	WHC	CMS	Ramsar	UNCCD	
Argentina	Y	Y	N	Y	Y	Y	Y	Y	Y	8
Bolivia	Y	Y	Y	Y	Y	Y	Y	Y	Y	9
Chile	Y	Y	N	Y	Y	Y	Y	Y	Y	8
Colombia	Y	Y	Y	Y	Y	Y	Y	Y	Y	9
Ecuador	Y	Y	Y	Y	Y	Y	Y	Y	Y	9
Peru	Y	Y	Y	Y	Y	Y	Y	Y	Y	9
Venezuela	Y	Y	Y	Y	Y	Y	Y	Y	Y	9

Y=Part of the agreement, N=Not part; CBD= Convention on Biological Diversity; CITES= Convention on International Trade in Endangered Species of Wild Fauna and Flora; CPB= Cartagena Protocol on Biosafety; UNFCCC= United Nations Framework Convention on Climate Change; UNFF= United Nations Forum on Forests (all UN member states); WHC = World Heritage Convention; CMS = Convention on Migratory Species; Ramsar = Convention on Wetlands of International Importance; UNCCD = United Nations Convention to Combat Desertification.

Under the CBD, hotspot countries have taken important policy and regulatory measures for its implementation. For example, national biodiversity strategies and action plans have been developed by all hotspot countries, as well as reporting on compliance with the Aichi Biodiversity Targets until 2019. Currently, all countries in the region are part of the international debate on the post-2020 Global Biodiversity Framework, which is moving towards greater integration of global concerns related to climate change and the fulfillment of the 2030 Agenda.

All countries in the hotspot have joined the UNFCCC, with the aim of stabilizing greenhouse gas concentrations at a level that prevents dangerous anthropogenic interference with climate. One of the commitments made in that convention is the Paris Agreement (2016) to combat climate change and accelerate and intensify the actions and investments needed for a sustainable low-carbon future. To achieve this, countries committed to defining their own efforts, which are embodied in their respective Nationally Determined Contributions (NDCs) that emphasize the important role of protected areas in ecosystem restoration, landscape connectivity and provision of ecosystem services (see Chapter 10).

Under the Ramsar Convention on Wetlands of International Importance, hotspot countries have designated a total of 96 Ramsar sites representing an area of more than 29.7 million hectares, including the addition of ten new sites between 2015 and 2020. In particular, within the hotspot there are 33 Ramsar sites, of which 31 are KBAs (Table 8.4).

Table 8.4 Ramsar Sites in the Hotspot

Country	Ramsar Sites in the Hotspot	KBA
Peru	Junín	No
Peru	Titicaca	Yes
Peru	Laguna de Salinas	Yes
Peru	Laguna del Indico-Dique de los Españoles	Yes
Peru	Lagunas Las Arrebiatadas	Yes
Peru	Lucre	Yes
Ecuador	Cajas	Yes
Ecuador	El Angel	Yes
Ecuador	Yacuri	Yes
Ecuador	Llanganati	Yes
Ecuador	Podocarpus	Yes
Ecuador	Ñucanchi Turupamba	Yes
Colombia	Sistema Lacustre de Chingaza	Yes
Colombia	Sistema Delta Estuarino del Rio Magdalena, Ciénaga Grande de Santa	Yes
Colombia	Laguna del Otún	Yes
Colombia	Laguna de La Cocha	Yes
Colombia	Complejo de Humedales Alto Rio Cauca asociado a la Laguna de Sonso	Yes
Colombia	Complejo de Humedales Urbanos del Distrito Capital de Bogotá	Yes
Chile	Salar del Huasco	Yes
Chile	Salar de Surire	Yes
Chile	Salar de Tara	Yes
Chile	Aguas Calientes IV	No

Chile	Pujsa	Yes
Chile	Soncor Hydrological System	Yes
Bolivia	Cuenca de Tajzara	Yes
Bolivia	Los Lípez	Yes
Bolivia	Lagos Poopó y Uru	Yes
Bolivia	Lago Titicaca	Yes
Bolivia	Rio Matos	Yes
Argentina	Lagunas Altoandinas y Puneñas de Catamarca	Yes
Argentina	Lagunas de Vilama	Yes
Argentina	Laguna de los Pozuelos	Yes
Argentina	Refugio Provincial Laguna Brava	Yes

Source: Ramsar site information services.

8.2.2 Decentralized Management of Conservation Policies

All the countries of the Andean region are unitary states, with the exception of Argentina, a federal state with high capacity for autonomous decision-making.
Regarding the decentralization of environmental management, particularly of conservation policies, some countries have assumed decentralization and deconcentration as part of an administrative process of efficiency and modernization of the national government. In contrast, others have maintained an orientation towards the construction of citizen power. This difference in approach is reflected in institutional design, which, in some cases, such as Chile or Colombia, explicitly incorporates consultative councils and other mechanisms for citizen participation in the management of public policies.

Given Argentina's federal structure, environmental governance is decentralized. According to the National Constitution, provinces have jurisdiction over their renewable (forests, biodiversity, water) and non-renewable (hydrocarbons, mining) natural resources, while the central government—in agreement with the provincial legislature—is in charge of establishing legislation on minimum budget requirements for the environment and natural resources.

Chile is strongly centralized in Santiago. The administrative organization of the country includes regions, provinces and municipalities that have decentralized responsibilities in health and education. In terms of environmental management, Chile has a robust institutional framework with multiple agencies at the central and deconcentrated levels. Through the regional ministerial secretariats (SEREMI by its acronym in Spanish), the Ministry of the Environment coordinates with the fifteen regional environmental advisory councils, conceived as agencies whereby the relationship between organized civil society and the Ministry of the Environment can be deepened and strengthened.

Peru also has a strong political and economic centralization in Lima; its territorial administrative structure is decentralized into regions, provinces and districts with popularly elected authorities and financial and administrative autonomy. These divisions complement the central government's planning, intervention and local environmental initiatives. Multiple public institutions and agencies converge in environmental management, some operating at the national level and others at the regional or subnational level. In recent years, several institutional reforms have been undertaken to improve the performance and multilevel coordination of environmental management.

Bolivia has several urban hubs, other than La Paz, such as the city of El Alto, which has a largely indigenous population and is a regional economic and political center. There are also cities of great regional economic importance, such as Santa Cruz. At the subnational level, Bolivia is organized in departments and municipalities, which are forms of local government, with elected authorities and political-administrative autonomy within the national state structure of planning, economic management and environmental policies. Natural resource management follows the same pattern, as Bolivia has a system of national, departmental and municipal protected areas. It also has growing social movements concerned about water resources, protected areas and biodiversity.

Colombia is organized into 32 departments and the Capital District of Bogotá, in addition to special districts in metropolitan areas. The country has an important level of departmental and municipal decentralization with elected authorities that implement national and departmental environmental policies. The Regional Autonomous and Sustainable Development Corporations (*Corporaciones Autónomas Regionales y de Desarrollo Sostenible*) are the primary environmental authorities at the regional level. They are public corporate entities, created by law, with administrative and financial autonomy, their own assets, and legal status, responsible for managing the environment and renewable natural resources and promoting sustainable development, in accordance with legal provisions and policies of the Ministry of the Environment.

Ecuador has high levels of decentralization and is organized into provinces, municipalities and rural parish councils, each level of government with elected authorities. National resources are distributed among the decentralized autonomous governments, in addition to generating their own revenues. Provincial governments are responsible for agricultural development, watershed management, climate change and other environmental issues within their jurisdictions, concurrent with the executive branch. This level of government generates initiatives that are more closely linked to biodiversity conservation within the hotspot.

Venezuela also has a decentralized state structure with environmental management jurisdiction by state and municipal authorities that are elected every four years. The country's economic situation has severely impacted the environmental management capacity of decentralized governments, including for the management of biodiversity and protected areas.

8.2.3 Sectoral Public Policies and their Relationship with the Hotspot

The pandemic and post-pandemic scenarios pose some challenges to national policy and cooperation initiatives. In some cases, it may lead to food security problems in economically vulnerable populations; loss of rural jobs due to a decrease in exports, as a result of possible contractions in international demand; difficulties in access to credit and markets for family farming and small and medium-sized companies.

The region’s economic outlook is grim, but it may not necessarily lead to political instability or a democratic governance crisis. However, there may be scenarios of popular mobilization and social protests that will demand consistent responses from national governments to meet the growing needs of the population in societies that increasingly value their social, political and environmental rights.

The COVID-19 pandemic also highlights the negative consequences of the social weakening of national governments, the lack of investment in health, and the weakening of social protection systems in several countries.

Agriculture

The Andean countries have a strong agricultural orientation; medium and large agricultural companies coexist with extensive (palm or soybean plantations) and intensive (flowers) production and small properties, including individual or family smallholders within the lands of ancestral peoples' communities. This bimodal agriculture is often a source of conflict over resources such as water and soil, but it has also led to the emergence of a series of cooperation mechanisms and alliances between entrepreneurs and family or community farmers in some experiences such as coffee, cocoa and dairy production. At the same time, agriculture is one of the main drivers of ecosystem transformation and biodiversity loss in the hotspot, mainly due to deforestation prior to planting, uncontrolled burning and the use of chemicals to increase productivity and combat pests. Chapter 6 describes how this activity was categorized as one of the four threats that have the greatest impact on the hotspot, according to the opinion of local experts.

Between 2000 and 2016, regional agricultural production and productivity increased for most commodities, but growth rates vary across countries and commodities (FAO 2019). Agricultural production in the hotspot can be broadly classified into three groups: non-traditional export crops, traditional export crops, and crops for domestic/regional consumption. These crops cover an area of approximately 9.5 million hectares, or about 80 percent of the region's arable land. Nontraditional exports had the highest average annual rates of increase in production and harvested land (5.4 and 5.2 percent, respectively) (Malaga *et al.* 2019).

Non-traditional products that link conservation and production include those arising from sustainable entrepreneurship or, as it is known in some countries, bio-entrepreneurship. This development has been possible thanks to progress in public and private policies guided by sustainability principles which, depending on each country, adopt a particular approach and name (e.g., green growth in Colombia or bioeconomy in Ecuador, Chile or Argentina). This environment has been favorable for cooperation agencies, NGOs and companies to explore new ventures based on the use of biodiversity and agrobiodiversity. Thus, in the hotspot there has been an escalation of bio-businesses and the multiplication of incubators, accelerators and economic promotion agencies that stimulate early entrepreneurial activity in the hotspot.

Civil society nature reserves (*Reservas Naturales de la Sociedad Civil* - RNSC) in Colombia, are an example of a private conservation strategy that promotes the link between conservation and production, mainly through agriculture (coffee, cacao and silvopastoral livestock), which CEPF has supported with its investments in the hotspot. In Colombia there are 685 RNSCs registered in the National Natural Parks system covering 44,172 hectares within the hotspot, in addition to those that are not registered but which, for environmental purposes, fulfill the same function. In this sense, the Investment Strategy (see Chapter 13) considers the registration of private protected areas a means of improving the protection of KBAs.

Despite the above, the Andean region is characterized by common structural problems in rural areas: high inequality in land distribution, fragmentation of land ownership, high rural poverty rates that exceed those of urban poverty, difficulties for small producers in accessing markets and limited access to credit and technical assistance. In Ecuador, for example, *campesino* production is marked by small land ownership; six out of ten private production units are less than 5 hectares in size. Half of rural families (i.e., nearly two million Ecuadorians) survive on production units of 2 hectares or less. This structural situation in access to land and other natural resources accentuates problems of malnutrition, emigration and poverty (Pastor C. Pazmiño. 2019).

This situation is common to all Andean countries, which are witnessing new processes of land concentration linked to agricultural exports and of refocusing economies, as some sectors have described it. In response to this land concentration, much progress has been made in legalizing land titles and territories of ancestral peoples, particularly in Bolivia, Peru and Ecuador.

Rural development programs have lost momentum in the region over the last 30 years and thus, support for family farming is still of fundamental importance. Existing programs have shifted their focus to improving productivity, incorporating added value, access to markets, technology and credit, as well as promoting good environmental practices.

Despite the statistical difficulties in measuring the contributions of family farming (due to production units' surface area, their relationship with the market and the type of products), there is broad consensus on its fundamental importance in guaranteeing food security in the region. The FAO (2014) estimates that family farming and indigenous communities provide 70 percent of the food consumed in the countryside and cities.

In the last ten years, the need to generate and support initiatives aimed at strengthening family and *campesino* agriculture has been placed on national political agendas. In some countries, specific regulations and state institutions have been created to support family farming. In the case of Peru, there is a strategy as public policy from 2014 to 2021. Other national examples include Law 144 of the Community Agricultural Productive Revolution (*Revolución Productiva Comunitaria Agropecuaria*) (2011) and the Law of Mother Earth (*Madre Tierra*) on food sovereignty (2012) in Bolivia, and the Law on Ancestral Lands and Territories (2016) in Ecuador.

Due to the multifunctional nature of family farms, the improvement of family agriculture allows for the development of other non-agricultural activities, such as nature-based tourism, agricultural product processing and agroforestry initiatives. On occasion, this allows for successful associative policies to improve production, prices and open domestic and export markets that promote good social and environmental practices. These aspects can, in turn, improve productive capacity and reduce rural poverty significantly, as has been proven in countries such as Bolivia in the last decade.

Forests and Silviculture

As mentioned in Chapter 7, forestry is an important economic sector in all hotspot countries. For this reason, vigorous public policies have been adopted for the protection, restoration and sustainable use of natural forests, as well as policies to promote forest plantations for commercial purposes. These policies are usually related to international agreements such as the United Nations Forum on Forests, the Bonn Challenge or the UNFCCC. As a key ally in the fight against climate change, the forestry sector has taken an active part in national efforts to reduce deforestation, illegal logging and land-use change, joining initiatives that promote sustainable forest management, forest certification and the supply of timber and other forest resources from legal and sustainable sources.

From different perspectives, all countries have made progress in sector governance policies, implementing dialogue and coordination processes between public, private and civil society stakeholders, which have made it possible to update legal and regulatory frameworks, strengthen capacities, attract investments and manage forest cooperation projects. Working groups promoted by national REDD+ strategies have played an important role in this regard. The integration of conservation approaches to forest production and commercial use of non-timber resources, such as bio-entrepreneurship initiatives in protected areas, demonstrates a new forest culture that understands that societies need to use forest resources responsibly and sustainably.

Information systems that enable decision-making in sustainable forest management have also improved. Countries' efforts to improve general knowledge of available forest resources through inventory processes or assessment are noteworthy. These processes have made it possible to provide updated, official and reliable information for the design and implementation of policies in the sector, including investment decisions and forest sector development. The hotspot countries present different situations with respect to the availability of forest inventories. In general, the use of remote sensing technologies (which must be combined with ground information) is widespread. In some cases, inventories are adapted to meet REDD+ requirements, which include the establishment of a Measurement, Reporting and Verification (MRV) system. Also noteworthy are the advances in real-time deforestation monitoring through satellite images that enable increased control and oversight at a lower cost.

Several countries have experience implementing incentive programs for native forest conservation and environmental services payment mechanisms (see Chapter 11) and are implementing several large-scale REDD+ projects. Ecuador, for example, stands out in the region for the significant amount of funding mobilized from the Global Environment Facility (GEF) and the Green Climate Fund (GCF) under REDD+ mechanisms. Also important are afforestation and reforestation programs, almost always associated with watershed protection, restoration of degraded ecosystems and generation of economic incentives for forestry production. A pending task, on which little progress has been made in the hotspot, is related to applied research in the forestry sector to generate knowledge that will provide alternatives for the management and harvesting of new species with commercial value and alleviate pressure on the populations of overexploited species.

Land tenure issues in the rural sector and the associated legal insecurity are some of the most important obstacles to sustainable forest resource management. This is an issue that CEPF will address in its investment strategy, as the conservation of several KBAs depends on securing the land ownership rights of legitimate forest tenure holders, which are generally rural and indigenous communities located in places that include significant areas of native forest remnants.

Water: Rural Development and Urbanization

Access to and distribution of water has been a permanent concern in Andean states and societies. For decades, strong public, private and community investments have enabled water infrastructure construction to meet the growing demands of human consumption in societies with increasing population trends and agricultural and industrial production.

Increasing water concerns include fundamental issues such as the conservation of water sources and the quality of the resource. Water sources are threatened by the permanent agricultural frontier expansion in forests and *páramos*, the expansion of cities, and the effects of climate change, such as the loss of glaciers and precipitation anomalies. Water quality issues are rooted in the lack of control over the use of agrochemicals in agricultural production, the lack of control over industrial waste, particularly in activities such as illegal mining, and the lack of adequate treatment of domestic and industrial wastewater.

Policies for watershed and micro-watershed management increasingly incorporate the participation of civil society, local governments and national government institutions. These synergic and active participation mechanisms have been most appropriate in implementing integrated water resource management policies. Water governance policies also allow for the prevention of social conflicts arising from the violation of the human right to water. From that perspective, integrated water resources management (IWRM) constitutes a fundamental process that integrates resource conservation and local economic development. Its actions and policies range from water source protection, restoration of degraded lands, integrated fire management and prevention, wastewater treatment, among other coordinated management efforts that promote access and democratic distribution of the resource.

Some of the most important aspects linked to water demand include urbanization, infrastructure construction, waste and chemical treatment and channeling compensation to communities and rural populations in generation or recharge sites. Latin America is one of the most urbanized regions on the planet; its population is mostly urban as countryside to city migration continues. Around 75 percent of the population live in cities, generating a constant demand for resources such as water. Currently, one in four cities around the world suffers from water stress, and projections indicate that water consumption will double every 20 years. This situation has led to a series of measures to regulate water collection and distribution, as well as updates in national water regulations and standards.

Chapter 11 describes the available water funds, a water resource conservation strategy in hotspot countries in detail, and Chapter 5 highlights the importance of KBAs as water ecosystem service providers, both for human and agricultural consumption. Both initiatives respond to increasingly recurrent pressures posed by droughts caused by climate change, for example, those that occurred in Bolivia in 2016 and 2020, where a national emergency was declared.

8.2.4 Biodiversity Financing Policies

Hotspot countries have developed a variety of mechanisms and instruments to finance the conservation and sustainable use of biodiversity. The countries' experience in financial solutions management is diverse, with a greater degree of development in Colombia, Ecuador, Peru and Chile. These countries all joined the global initiative "Finance for Biodiversity" (*Finanzas para la Biodiversidad* -BIOFIN) in 2015 to develop financing strategies for sectoral policies and national biodiversity strategies, formulated to meet the Aichi Targets. As a result, the region has a robust catalog of financial solutions adapted to national circumstances, which are being applied by the countries to close the financial gaps identified and meet national biodiversity conservation objectives.

Financing strategies for climate change management developed in the hotspot countries, as part of the fulfillment of their Nationally Determined Contributions (NDCs) under the Paris Agreement, are equally important. In climate change management, the "ecosystems", "biodiversity", or "natural heritage" sectors have been integrated to achieve greater efficiency in the implementation of adaptation and mitigation measures. Climate finance, thus, constitutes a new window of opportunity to achieve common objectives between global agendas pursued by the Convention on Biological Diversity and the United Nations Framework Convention on Climate Change. This favorable situation is reflected in Chapter 10.

As an example, Peru has achieved significant development in initiatives linked to the carbon market regulated by the Clean Development Mechanism (CDM), while Ecuador and Colombia

have done so under the mechanism of payment for results, through the REDD Early Movers (REM) program and the Green Climate Fund. Currently, these two mechanisms finance measures and actions related to the protection of forests and water sources, restoration of degraded ecosystems, control and surveillance, forest monitoring, and promotion of bio-companies, among other key actions taking place within the Tropical Andes Hotspot.
With the exception of Venezuela, all hotspot countries have submitted their third national communications (TNC) to the UNFCCC. These documents detail, among other substantive aspects, the financial flows, sources, destinations, mechanisms and instruments used by countries to finance activities or projects aimed at or expected to result in the management of greenhouse gas emissions or adaptation to climate change. These reports also address the mechanisms that the conservation sector has used to finance its initiatives, making them an important reference source. At present, several hotspot countries are in the process of preparing their fourth national communications, which is evidence of the commitment of governments and states to achieve a gradual transition to low-carbon and climate-resilient economic systems.

The following is a brief review of some of the public and private financing mechanisms that have been implemented in the hotspot. It is intended to illustrate the orientation of public policy and the opportunities that CSOs have been able to create, with support from international cooperation partners as well as the impact achieved in recent years.

In Ecuador, with an investment of approximately US$100 million, the Ministry of Environment and Water (*Ministerio del Ambiente y Agua* - MAAE) administers the Socio Bosque Program (PSB by its acronym in Spanish), which has been in operation for 12 years and has led to the conservation of more than 1.6 million hectares of native forests in the country. Under its investment in the Tumbes-Chocó-Magdalena Hotspot, CEPF helped finance the pilot program that served as the basis for establishing the Socio Bosque Program. The economic incentive received by individual and collective landowners, especially indigenous peoples and nationalities, Afro-descendants and local communities, comes from fiscal sources and international cooperation. This incentive is reinvested in the protection of the area, the conservation of biodiversity and the promotion of production to meet food and income-generating needs. The program has three components or chapters: forests, *páramos* and mangroves. Several KBAs and other areas in the corridors receive funding from this mechanism: Reserva Ecológica Cofán-Bermejo (ECU60), Reserva Ecológica Cotacachi-Cayapas (ECU61), Territorio Étnico Awá y alrededores (ECU70) or Parque Nacional Sangay (ECU51), to mention just a few.

In Peru, the National Forest Conservation Program for Climate Change Mitigation (*Programa Nacional de Conservación de Bosques para la Mitigación del Cambio Climático* - PNCBMCC), administered by the Ministry of the Environment (MINAM by its acronym in Spanish), provides an economic incentive and technical assistance to 275 communities in nine regions to promote the conservation of approximately 2.9 million hectares of communal forests, benefiting more than 15,000 families. Thanks to the incentive, communities are implementing sustainable production systems such as timber and non-timber resources management, ecotourism, agroforestry with cacao and coffee, and fish farming, among other sustainable activities that enable them to earn income, improve their quality of life, and ensure forest conservation.

The region has significant experience in the development of environmental funds. Chile has the Environmental Protection Fund, which is the first and only competitive national fund that supports civil society environmental initiatives. The fund was created to support citizen initiatives and fully or partially finance projects or activities aimed at protecting or repairing damage to the environment, sustainable development, nature preservation or conservation of environmental heritage. In its last call, in 2019, the fund supported initiatives aimed at contributing to the development and strengthening of the environmental education center Parque Natural Cantalao Precordillera; Green Areas Contest; Local Environmental Management Contest; Sustainable Schools Contest; and Indigenous Environmental Protection and Management Contest.

Argentina Ambiental is a portal that supports the efforts of entrepreneurs, the government and the community to improve quality of life, protect nature and promote sustainable development. This portal operates the Fund for Environmental Conservation (*Fondo para la Conservación Ambiental*), which in 2019 opened the tenth call to accompany and encourage research and environmental management projects. The lines of financing are related to conservation in protected areas, management of invasive exotic species, renewable energies, energy efficiency and urban environments. Similarly, the National Ministry of Agriculture, Livestock and Fisheries (2020) launched a call for sustainable environmental management projects. This is a fund for non-refundable contributions of up to 60% of investments in renewable energies and energy efficiency in productive establishments. This has been possible thanks to the contribution of funds to technological modernization of the Provincial Agricultural Services Program (*Programa de Servicios Agrícolas Provinciales* - PROSAP) managed by the General Directorate of Sectoral and Special Programs and Projects (*Dirección General de Programas y Proyectos Sectoriales y Especiales* - DIPROSE).

In Ecuador, the Sustainable Environmental Investment Fund (*Fondo de Inversión Ambiental Sostenible* - FIAS) manages six accounts or funds with a range of themes: 1) management of protected areas; 2) eradication of invasive species in Galapagos; 3) payment for results in deforestation reduction; 4) financing Socio Bosque incentives; 5) management of marine-coastal ecosystems; and 6) management of the Galapagos Marine Reserve. FIAS is a trust fund that has received contributions from various sources: international cooperation, private sources, debt swaps, and others. It is important to highlight the contribution of approximately US$ 2 million annually from the Protected Areas Fund (*Fondo de Áreas Protegidas* - FAP) to cover basic operating expenses of several protected areas, some of which are KBAs, located within the hotspot: Reserva Ecológica Cotacachi Cayapas (ECU61), Reserva Ecológica los Illinizas y alrededores (ECU42), El Angel-Cerro Golondrinas (ECU31), Parque Nacional Sangay (ECU51), Podocarpus (ECU50) and Llanganates (ECU49). Currently, this contribution is essential for the administration of the National System of Protected Areas.

In Peru, Profonanpe manages financial resources to implement programs and projects that contribute to biodiversity conservation and climate change mitigation and adaptation. With more than 25 years of existence, Profonanpe has established itself as the most important private environmental fund in Peru, whose institutional design allows it to manage trust funds. In fact, Profonanpe leverages financial resources in the design and implementation stages of initiatives (projects, programs and others) and applies financial strategies to achieve the highest return on funds.

Certainly, the creation and management of environmental funds has been mainly related to the experience of CSOs, particularly NGOs. However, in recent years, environmental funds have gained recognition for their effectiveness and impact in meeting conservation goals and promoting local development. At present, several environmental funds are part of public policies in some of the hotspot countries. For example, in Ecuador, the Organic Environmental Code (*Código Orgánico del Ambiente*), approved in 2017, created the National Environmental Management Fund (*Fondo Nacional de Gestión Ambiental*), which is in the process of being established.

Similarly, there are several environmental funds in the hotspot that maintain programs, projects and open calls for proposals to finance initiatives for conservation, sustainable use and improvement of the quality of life of the communities. An example of this is the Natural Heritage Fund in Colombia, which since 2005 has executed 466 agreements in 177 projects and programs. These have been implemented in 231 municipalities in 32 departments and 58 national protected areas, covering the country's main ecosystems. Along with Profonanpe in Peru, the Natural Heritage Fund hosted the regional implementation team for the second phase of CEPF's investment in the hotspot.

Regarding the management of water funds, there are several funds made up of a broad spectrum of public organizations at the national and subnational levels, private entities and international cooperation: Argentina (Mendoza); Chile (Maipú river, Santiago); Peru (Lima and Callao); Ecuador (Quito, Cuenca and other municipalities in the Paute basin, Tungurahua province with several municipalities, Guayaquil and the southern region of the country); Colombia (Bogotá, Cali, Medellín, Cartagena, Santa Martha, Cúcuta, and Valle del Cauca with several municipalities) and Venezuela (Merida).

These mechanisms have allowed for mobilization of several tens of millions of dollars (see Chapter 11) to protect water sources, restore degraded ecosystems, and carry out research, environmental education, and sustainable production. CEPF has made a contribution to the development of these economic instruments for conservation. For example, between 2017 and 2020, it supported Fundación Natura Bolivia in the creation of three municipal water funds in the municipalities of Coroico, Caranavi and Yanacachi for the protection of 20,000 hectares near several KBAs such as Cotapata (BOL13) and Parque Nacional and Área Natural de Manejo Integrado Cotapata (BOL45), resulting in improved quantity and quality of the water supply for 4,000 families.

Finally, from the perspective of promoting innovative and sustainable ventures based on the use and exploitation of biodiversity in the hotspot, it is important to mention the increase of impact investments for the development of social ventures in the region. Institutions such as Corporación de Fomento de la Producción (CORFO) in Chile or Alianza para el Empredimiento e Inovación in Ecuador, as well as programs such as "Innóvate Perú", "Emprende Ecuador Productivo" or "Colombia emprende e innova", are just some of the examples of financing opportunities for sustainable ventures in which there has been significant coordination between the government, academia and the private sector.

8.3 Overview of the Institutional Framework for Conservation in the Hotspot

8.3.1 Institutional Framework in Hotspot Countries

Argentina

Since Argentina is a federal state, its environmental governance is decentralized. According to the National Constitution, the provinces have jurisdiction over their renewable natural resources (forests, biodiversity, water) and non-renewable natural resources (hydrocarbons, mining), while the national government - in agreement with the provincial legislatures - is in charge of establishing legislation on minimum budget requirements for the environment and natural resources.

The Ministry of Environment and Sustainable Development is the institution in charge of environmental policy, sustainable development and rational use of natural resources such as water, forests, wildlife, soil preservation and the fight against climate change. In addition, it executes plans, programs and projects dedicated to these issues and is responsible for the control, inspection and prevention of pollution. In addition, it promotes sustainable development through actions that guarantee the quality of life, availability and conservation of natural resources.

The management and conservation of certain species, declared "national monuments", are regulated at the national level. In the hotspot area, these are the vicuña (*Vicugna vicugna*), the Andean deer or taruca (*Hippocamelus antisensis*) and the jaguar (*Panthera onca*). All other species are regulated under provincial legislation and regulations, as is also the case for non-renewable natural resources.

Bolivia

The Ministry of Environment and Water is in charge of environmental planning, policy and management. The Vice-Ministry of Environment, Biodiversity, Climate Change and Forest Management and Development (VMA by its acronym in Spanish) is the national authority for biodiversity and protected areas and supervises the national system of protected areas through the National Protected Areas Service (*Servicio Nacional de Áreas Protegidas - SERNAP*). In 2012, departmental governments received the power to administer protected areas in order to improve their management. However, underfunding remains a trend, especially due to continued budget cuts that affect SERNAP.

The Mother Earth Law has strengthened decentralization and the autonomous movement. Subnational governments (departments and municipalities) have strengthened their legislative frameworks (autonomous statutes and organic charters) with greater authority for landscape planning, sustainable use and conservation. Shared management of all protected areas that overlap with indigenous territories is an important mechanism that has emerged from Bolivia's regulatory framework, affecting almost all of the country's protected areas. Shared management of Community Territories of Origin (*Territorios Comunitarios de Origen - TCO*) involves areas around several KBAs, such as the Parque Nacional y Territorio Indígena Isiboro Sécure (TIPNIS by its acronym in Spanish) or the ANMIN Apolobamba, which borders the Leco-Quechua Apolo Indigenous Territories (TCOs). In las Yungas Inferiores de Pilón Lajas (BOL37), CEPF financed the preparation of the *plan de vida* (life plan) and the management plan for Pilón Lajas Biosphere Reserve and Communal Lands, through the local indigenous authorities during Phase II. CEPF's Phase II investments have served as catalysts for collaboration and offer important lessons for future work in the KBAs within the Madidi-Pilón Lajas-Cotapata Corridor.

Responsibility for granting environmental licenses for low-risk projects (those that do not require environmental impact assessments) was transferred to the departmental and municipal governments in 2011 (Supreme Decree No. 902) to adjust the review processes and to expedite public investment in projects. Since 2008, road construction has been the sector with the greatest public investment in the country and has caused conflicts with indigenous territories (e.g., TIPNIS). Environmental authorities, both at the national and subnational levels, often do not have the institutional capacity to significantly influence the national government's public agenda.

Chile

The Ministry of the Environment and the Council of Ministers for Sustainability are the central government entities that play vital roles in environmental and biodiversity issues. In addition,

the Environmental Advisory Councils are mechanisms for citizen participation where environmental policy is formulated and discussed. The Ministerial Council includes delegates from different sectors of the executive power (Agriculture, Finance, Health, Economy, Transport, Energy, Public Works, Mines and others), while the Advisory Council represents multiple stakeholders, e.g. academia, NGOs, private sector and labor.
Biodiversity, ecosystems and protected areas are managed by the Natural Resources and Biodiversity Division, while environmental impact in these areas is managed by autonomous government services. The Biodiversity and Protected Areas Service is in charge of the National System of State Wildlife Protected Areas (SNASPE by its acronym in Spanish), currently under the National Forestry Corporation (*Corporación Nacional Forestal - CONAF*).

Environmental policy in the region is supervised by regional ministerial secretariats, which are entities of the Ministry of the Environment that coordinate policy implementation at the subnational levels. These secretariats are responsible for collaborating with, and supporting, regional and municipal governments to incorporate environmental considerations into their plans and strategies.

The Superintendency of the Environment and the Environmental Courts are responsible for environmental law enforcement in Chile. These functions are institutionally separate and independent from the policy and programmatic functions of the Ministry of Environment.

Colombia

The management of natural resources and environment is organized in Colombia in the National Environmental System (*Sistema Nacional Ambiental – SINA*), which integrates all national, regional and local agencies responsible for environmental issues. The lead agency for environmental policy is the Ministry of Environment and Sustainable Development (MADS by its acronym in Spanish) and it participates in various regional planning bodies to integrate these policies in other sectors. The SINA also includes:

- Regional Autonomous Corporations (*Corporaciones Autónomas Regionales - CAR*), environmental authorities with jurisdiction over specific territories established on the basis of 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 (*Instituto de Investigaciones Ambientales del Pacífico*), the Amazonian Institute of Scientific Research Sinchi (*Instituto Amazónico de Investigaciones Científicas Sinchi*) (for the Amazonian slope of the Andes), the Institute of Hydrology, Meteorology and Environmental Studies (*Instituto de Hidrología, Meteorología y Estudios Ambientales - IDEAM*) and the Center for Research and Studies on Biodiversity and Genetic Resources (*Centro de Investigaciones y Estudios en Biodiversidad y Recursos Genéticos - CIEBREG*);
- The Administrative Unit of the National Parks System, which reports to the MADS, but with a high degree of autonomy. At the operational level it is divided into six Subsystems of Regional Protected Areas and six Thematic Subsystems of Protected Areas.
- NGOs whose missions include conservation and management of natural resources, as well as civil society nature reserves (private protected areas) registered with the national park system and environmental funds that are associated with the financing of protected areas. In Phase II, CEPF supported some projects aimed at the creation and strengthening of CSO nature reserves.

CARs play a vital role in conservation and biodiversity, as they have authority over important aspects of territorial planning, implementation and management in their jurisdictions. While several CARs have strong institutional capacity, many still face significant gaps. In recent years, CARs have undergone budget cut as legal reforms have reduced their share of royalty revenues from oil and mining, historically an important source of funding for these entities, as well as for conservation and land management. CEPF worked closely with the CAR of Cauca, for example, to co-finance projects in some KBAs in Phase II.

Other national entities are responsible for the licensing and supervision of mining and oil developments, including the National Environmental Licensing Authority (*Autoridad Nacional de Licencias Ambientales - ANLA*), the National Mining Agency (*Agencia Nacional de Minería - ANM*) and the National Hydrocarbons Agency (*Agencia Nacional de Hidrocarburos - ANH*), the last two under the Ministry of Mines and Energy.

Ecuador

The Ministry of Environment and Water (*Ministerio de Ambiente y Agua - MAAE*) is the governing institution for environmental and water policy in Ecuador, with regional directorates and technical offices distributed nationwide (the Water Secretariat merged with the Ministry of Environment in 2018). Biodiversity and genetic resources are considered strategic sectors by the Constitution; therefore, their management is the exclusive responsibility of the central government. Biodiversity, protected areas and forests are managed by the MAAE, through the Undersecretariat of Natural Heritage, while climate change and environmental quality are managed in conjunction with subnational governments.

Although efforts have been made to strengthen intersectoral and multilevel coordination, to meet national biodiversity conservation objectives, in the last few years, progress has been made only in certain areas. The subnational governments, for example, have shown keen interest and have made significant progress in conservation area management. This has been due, in part, to the value of natural areas for ecosystem services provision, such as water or landscape, and the opportunity that this generates for the development of economic activities, such as nature tourism, bio-entrepreneurship and sustainable agriculture.

For this reason, Ecuador has significantly increased the number of Conservation and Sustainable Use Areas (*Áreas de Conservación y Uso Sustentable - ACUS*), which have complemented, at the subnational level, the representation of ecosystems in the National System of Protected Areas and have contributed to connectivity between different conservation units. CEPF has collaborated in the preparation of technical baseline studies and in the process of declaring several ACUS, including Intag-Toisán (ECU34), Abra de Zamora (ECU2), and the Yunguilla Reserve (ECU65), contributing to local biodiversity conservation processes.

Peru

The Ministry of the Environment (MINAM by its acronym in Spanish) is the national entity in charge of environmental issues, including natural resource policy and management. Seven institutions are part of MINAM, which include the National Service of Protected Areas (*Servicio Nacional de Áreas Naturales Protegidas por el Estado -SERNANP*), responsible for the administration of protected areas, both national and those delegated to third parties. Private areas are important for conservation, and CEPF has contributed to strengthening them through projects such as the one developed in the Northeastern Conservation Corridor through the Peruvian Society of Environmental Law (*Sociedad Peruana de Derecho Ambiental – SPDA*).

The Ministry of Agriculture and Irrigation (*Ministerio de Desarrollo Agrario y Riego - MIDAGRI*) also plays a key role in establishing policies as well as in the administration and implementation of forest and wildlife programs through its General Directorate of Forestry and Wildlife (*Dirección General Forestal y de Fauna Silvestre - DGFFS*). This directorate is in charge of proposing national policies, strategies, norms, plans, programs and projects related to the sustainable use of forest and wildlife resources and associated genetic resources, within the scope of its competence, in accordance with the National Environmental Policy and environmental regulations. It also acts as the CITES Management Authority.

The National Forestry and Wildlife Service (*Servicio Nacional Forestal y de Fauna Silvestre - SERFOR*) is the national authority specialized in promoting decentralization and capacity building of forestry authorities in the regions. San Martín, Madre de Dios and Cusco stand out as regions that are developing institutional and regulatory capacities for environmental issues, for planning, management and enforcement in their jurisdictions.

Venezuela

Venezuela has a broad regulatory framework that supports the conservation of biodiversity, forest resources and wildlife. The management and conservation of natural resources are mainly the responsibility of central government institutions, including the Ministry of People's Power for Ecosocialism (*Ministerio del Poder Popular para el Ecosocialismo - MINEC*), the Ministry of People's Power for Agriculture and Lands. (*Ministerio del Poder Popular para Agricultura y Tierras*). The National Parks Institute (*Instituto Nacional de Parques - INPARQUES*) is part of the MINEC and is responsible for the management of national parks, monuments and Areas Under Special Administration Regime (*Áreas Bajo Régimen de Administración Especial -ABRAE)*. The special administration areas pertain to national territorial development production, recreation and protection goals. INPARQUES and its subnational offices supervise the environmental regulations that correspond to each of these protection categories.

State governments often have Environmental and Social Development Departments that implement projects locally. Municipalities have limited participation in conservation; their involvement in environmental programs is usually confined to solid waste management and the provision of water supply to coastal cities. State and municipal authorities contribute to water management, which offers an opportunity for partnerships to strengthen conservation efforts.

8.3.2 Protected Area Management Legislation and Policies

All of the tropical Andean countries have made significant progress in consolidating national protected area systems (Table 8.5). Although each country has established different categories, standards and nomenclature for its protected areas, most of these are compatible with the categories established by the IUCN. All countries have legal frameworks favorable to protected areas and national agencies responsible for conducting conservation policy, regulation, control and administration of protected area systems. While countries such as Venezuela and Chile have regional agencies and offices in charge of protected areas, the other hotspot countries have a central agency that coordinates the management of subnational protected areas with regional, provincial or municipal jurisdictions.

Protected area systems also include World Heritage Sites and Biosphere Reserves of the United Nations Educational, Scientific and Cultural Organization (UNESCO), as well as Wetlands of International Importance (Ramsar Convention), many of which overlap with national protected areas. Bolivia's protected areas system includes ecological corridors as a category of protection. The corridor supported by CEPF's previous investments serves as an international reference for successful corridor conservation. Several KBAs such as Bosque de Polylepis de Madidi (BOL5), Cotapata (BOL13), and Yungas Inferiores de Pilón Lajas (BOL37) are part of the Madidi-Pilón Lajas-Cotapata Corridor. CEPF's previous work in partnership with Civil Association Armonía (*Asociación Civil Armonía*), Bolivian Association for Research and Conservation of Andean-Amazonian Ecosystems (*Asociación Boliviana para la Investigación y Conservación de Ecosistemas Andino Amazónicos - ACEAA*), T'simane Mosetene Regional Council (*Consejo Regional T'simane Mosetene*), Wildlife Conservation Society and other CSOs has increased the communities' capacity in territorial management and protection, as well as sustainable livelihoods through cacao cultivation and ecotourism.

Subnational protected areas are also expanding, although many are under less strict protection than national protected areas and have limited funding. In Argentina, the Federal System of Protected Areas (*Sistema Federal de Áreas Protegidas - SIFAP*), coordinates the management of protected areas across federal and provincial jurisdictions, with the intention of strengthening provincial protected area systems. Colombia's protected areas system also includes both national and regional areas, with regional subsystems under the authority of the CARs. In Peru and Ecuador, national systems integrate the conservation initiatives of subnational governments, although in Ecuador, several subnational governments have their own protected area management systems (e.g. Metropolitan District of Quito) with little articulation with the national system. Another form of area-based conservation implemented by subnational governments in Ecuador is the ACUS. There is no national registry of the ACUS created, but it is estimated that there are at least 15 areas under this denomination in the hotspot.

The administration of protected area systems in the region is increasingly open to demands for citizen participation in management and governance processes. Peru has applied a variety of management instruments, including public land concession mechanisms for long-term conservation managed by private companies, NGOs or communities. Ecuador is building a regulation to promote and guide social participation in protected area management. In Colombia, civil society reserves can be formally recognized within the national system for their role in conservation and landscape connectivity. Ultimately, all countries have mechanisms for shared management with indigenous and local communities where protected areas overlap collective territories.

Notwithstanding, protected areas throughout the region are still vulnerable to development pressures from private and public projects, including road construction, mining, oil, logging and hydro-generation concessions. Although significant progress has been made, the integration of protected areas into territorial development models remains a pending task, as do numerous cases of overlapping tenure and unfinished demarcation processes.

Table 8.5 Protected Area Institutions and Governance

Country	Description of the National System	Government Institutions Involved	Observations on Governance of Protected Areas
Argentina	The Federal System of Protected Areas (*Sistema Federal de Áreas Protegidas -SIFAP*) supervises all national areas and coordinates conservation policy with subnational levels.	SIFAP is managed by an Executive Committee formed by the Ministry of Environment and Sustainable Development (Technical Administrative Secretariat), COFEMA (Presidency), and APN (Coordination).	The National Parks Administration (*Administración de Parques Nacionales - APN*) is responsible for federal coordination (national) with provincial and municipal governments. Some protected areas of the federal system are managed by private stakeholders and universities. There are five indigenous and local communities with shared management modalities with SIFAP.
Bolivia	The National System of Protected Areas (*Sistema Nacional de Áreas Protegidas - SNAP*) includes areas at the national and departmental levels.	The National Protected Areas Service (*Servicio Nacional de Áreas Protegidas - SERNAP*), attached to the Ministry of the Environment, supervises national areas and those under shared management 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 protected areas, there is a shared management regime Territorial Management with Shared Responsibility (*Gestión Territorial con Responsabilidad Compartida - GTRC*).
Chile	The National System of Protected Areas (*Sistema Nacional de Áreas Protegidas - SNASPE*) includes terrestrial, aquatic, public and private areas.	The SNASPE is managed by the National Forestry Corporation (*Corporación Nacional Forestal - CONAF*) and is responsible for the integrated management, often through shared management schemes with private stakeholders.	Since 2016, CONAF has been implementing a new management model for the administration of national parks, which redefines key aspects such as financing, biodiversity conservation and governance models for the State's protected wild areas.
Colombia	The National System of Protected Areas (*Sistema Nacional de Áreas Protegidas - SINAP*) includes	SINAP is managed by National Natural Parks (*Parques Nacionales Naturales*), an autonomous agency of the Ministry of Environment and	Protection regimes include national parks, civil society reserves, and protected forest reserves, among other conservation and protected area categories. The CARs have the power to declare regional

	regional and thematic subsystems of national, regional, departmental, municipal, provincial, metropolitan or any other territorial nature.	Sustainable Development. It coordinates with the CARs, decentralized public offices present in each region. The CARs have reached an important level of institutional strengthening and are able to collect funding from both public and private sources.	protected areas. There are 23 organizations registered with National Parks that coordinate natural reserves managed by civil society. RESNATUR is the pioneer and the only one of national scope.
Ecuador	The National System of Protected Areas (*Sistema Nacional de Áreas Protegidas - SNAP*) includes four subsystems: areas protected by the central government; by subnational governments; by communities; and by private actors.	The Directorate of Protected Areas and Other Forms of Conservation manage the SNAP through regional directorates located throughout the country. Environmental units within the municipal or provincial governments coordinate the subnational systems of protected areas.	There are several indigenous groups that have shared management agreements where protected areas overlap their territories. The Private Forest Network (*Red de Bosques Privados*) supports the reserves of private stakeholders (individuals, NGOs, community organizations). There are some conservation initiatives led by subnational governments that have established corridors and protected areas.
Peru	The National System of Protected Areas (*Sistema Nacional de Áreas Protegidas por el Estado - SINANPE*) includes national, regional and private conservation areas.	The National Protected Areas Service (*Servicio Nacional de Áreas Protegidas por el Estado - SERNANP*) is the lead agency for protected areas and is part of the Ministry of the Environment.	Most protected areas have management committees that include the participation of multiple stakeholders. Communal Reserves (*Reservas Comunales*) are a category of protected area at the national level and are managed under a special regime for their administration in which the *campesino* or native communities co-manage these areas with the government. Several private conservation areas are managed by indigenous and local communities and NGOs.

Venezuela	The National Parks and Natural Monuments System (*Sistema de Parques Nacionales y Monumentos Naturales*) groups all areas under the Special Administration Regime (*Áreas Bajo Régimen de Administración Especial - ABRAE*).	The National Parks Institute (*Instituto Nacional de Parques - INPARQUES*) is in charge of the System. INPARQUES is part of the Vice-Ministry of the Environment and operates through subnational offices.	INPARQUES executes the conservation policy and manages protected areas through regional offices.

All hotspot countries have made significant progress in their financial sustainability strategies for protected area management. Fiscal allocations, visitor revenues and the economic dynamic generated by tourism are the main sources of income, although innovative compensation mechanisms, payment for ecosystem services, donations, incentives, corporate responsibility and crowdfunding have also been developed. FONAM and *Fondo Patrimonio* in Colombia, FIAS in Ecuador and PROFONANPE in Peru are examples of national funds that have managed to mobilize significant financial resources for protected areas management.

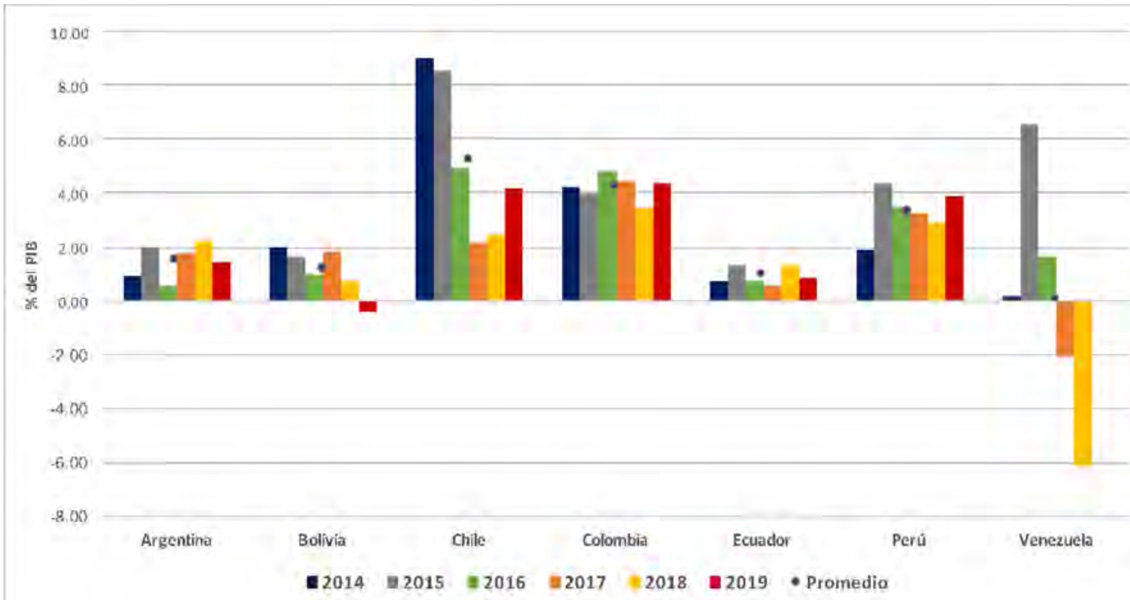
In Bolivia, 50 percent of after-tax revenues from park entrance fees support protected areas management (FUNDESNAP 2014). In Peru, resources generated in protected areas, such as entrance fees, tourism services, payment for ecosystem services, and REDD projects are reinvested in the SINANPE. In Venezuela, 5 percent of the budget for protected areas comes from resources generated by services and fees (ARA 2011). In Argentina and Chile, revenues generated by protected areas contribute 30 and 27 percent of the protected areas budget, respectively (RedLAC 2011).

8.4 Infrastructure and Multisectoral Development Strategies

8.4.1 Foreign Investment and Public Debt in Hotspot Countries

Foreign direct investment (FDI) has traditionally been an important element of the economies of hotspot countries. However, unlike the period 2010 to 2015, FDI in the region has declined since 2014 and is likely to continue to decline over the course of the following years (Figure 8.1) (ECLAC 2018). In fact, since 2012, the decline in foreign investment flow has been almost uninterrupted. In 2019, the five Latin American countries that received the highest FDI included Colombia (9%), Chile (7%) and Peru (6%) (Figure 8.1). These values highlight the relationship of FDI flows with cycles in commodity prices, especially in South American countries. Indeed, according to ECLAC (2020) FDI incomes in 2019 were 25% lower than in 2012.

Figure 8.1 Foreign Direct Investment in Hotspot Countries (% of GDP), 2014 – 2019



Source: International Monetary Fund, International Financial Statistics and Balance of Payments database, World Bank, Global Flows of Financing for Development, and World Bank and OECD GDP estimates. Available at: https://datos.bancomundial.org/indicator/BX.KLT.DINV.WD.GD.ZS

A much more complex scenario for the world and for the Andean region is presented in 2020. It is estimated that global FDI will fall by 40 percent in 2020 and by 5 to 10 percent in 2021, with a slow recovery by 2022 (UNCTAD 2020). ECLAC estimates offer a negative outlook for FDI in Latin America and the Caribbean, where the situation is particularly complex. Official information for 2020, which in the case of some countries includes information up to the third quarter and in others up to the second quarter, shows a decrease in FDI of 36% compared to that recorded in the same period of 2019. The drops are considerably more pronounced in the case of Peru, Colombia, Argentina and Chile as well as in countries outside the hotspot such as Brazil and Mexico (ECLAC 2020).

In the particular case of China, the pace of international expansion slowed for the third consecutive year in 2019, ranking fourth as an overseas investor behind Japan, the United States and the Netherlands, after having been the world's second-largest investor in 2018 (UNCTAD 2020). Between 2015 and 2020, China has emphasized acquisitions and mergers with Latin American companies. The United States has shown a more accentuated interest in making acquisitions in Europe. It should be kept in mind, however, that official FDI statistics reflect the immediate origin of the capital and many of the flows arrive in the region through third-party countries, so it is not possible to identify them in national accounts. This is particularly relevant in the case of Chinese investments, which tend to be underrepresented in official statistics of FDI inflows by origin (ECLAC 2019).

Table 8.6 presents information compiled by two U.S. institutions that monitor China's global investments. Here we can see the emphasis of this country on investing in strategic sectors such as alternative energies and metal mining, mainly.

Table 8.6 Chinese Investment by Sector in the Andean Countries (US$ million)

Country	Agriculture	Alternative Energies	Metals	Technology	Transport	Financial	Logistics	Total
Argentina		$800	$1,120	$300	$100			$2,320
Bolivia								
Chile	$830	$3,910	$4,280					$9,020
Colombia		$230			$140			$370
Ecuador			$920					$920
Peru		$5,090	$4,160		$780	$110	$230	$10,370
Venezuela		$2,070						$2,070

Source: China Global Investment Tracker, The American Enterprise Institute and the Heritage Foundation. Available in: https://www.aei.org/china-global-investment-tracker/

In terms of direct loans, excluding public debt bonds and other short-term commercial debt, Venezuela, Ecuador and Bolivia are the Latin American countries most dependent on Chinese financing.[29] However, according to World Bank forecasts published in April 2020 (World Bank 2020), most Latin American countries are expected to substantially increase their public debt this year. Ecuador, Colombia, Chile and Peru are among the seven Latin American countries that will increase their public debt as a percentage of GDP in 2020.

From a trade perspective, the main export destinations for the hotspot countries, with the exception of Bolivia, are the United States and China (Table 8.8).

Table 8.8 Main Export Destinations of Hotspot Countries (billions of dollars)

Country	Venezuela	Ecuador	Colombia	Peru	Bolivia	Chile	Argentina
United States	12.2	6.69	11.5	8.02		10.6	4.23
India	6.41			2.49	0.723		
China	6.32	1.5	4.07	13.3		25.3	4.34
United Arab Emirates	1.8						
Turkey	1		1.7				
Peru		1.66					
Chile		1.49					3.05
Panama		1.24	3.07				
Ecuador			1.86				
South Korea				2.47	0.579	4.39	

[29] https://es.statista.com/grafico/19693/paises-que-mas-le-deben-a-china/

Japan				2.18	0.672	7.06	
Brazil					1.72	3.39	11
Argentina					1.45		
Vietnam							2.08

Source: The Observatory of Economic Complexity (OEC). Retrieved from https://oec.world/es/profile/country/ven

8.4.2 Infrastructure and Multisectoral Development Strategies

From a regional integration perspective, infrastructure connectivity (roads, border crossings, telecommunications, electric power) within and between the countries is still quite poor. Since 2000, South American countries have been working together to become better connected and more integrated through infrastructure. The milestone that marked the beginning of this effort was the creation of the Initiative for the Integration of Regional Infrastructure in South America (IIRSA by its acronym in Spanish) by South American presidents. Its objective was the planning and implementation of infrastructure for regional integration. This initiative allowed, for the first time, twelve South American countries to coordinate their agendas to address infrastructure issues jointly, taking into account the transport, energy and communications sectors.

Within the Union of South American Nations (UNASUR) framework, the South American countries established a series of ministerial-level sectoral councils, one of which is the South American Infrastructure and Planning Council (*Consejo Suramericano de Infraestructura y Planeamiento - COSIPLAN*). The Council was conceived as a forum for political and strategic discussion to plan and implement the integration of the regional infrastructure of UNASUR member countries. IIRSA was incorporated as its technical forum. Thus, the ten years of experience and knowledge accumulated by this regional initiative formed the basis for COSIPLAN's work.

The work of IIRSA between 2000 and 2010, and of COSIPLAN since 2011, was oriented to the planning of infrastructure projects as a key component of the development of its territory. The Indicative Territorial Planning Methodology was the instrument that made it possible to create a Portfolio of Integration Infrastructure Projects. This methodology is based on the identification of nine integration and development axes, which organize the South American territory and organize the project portfolio. The hotspot region is linked to two of these axes: the Andean Axis and the Capricorn Axis. The portfolio is made up of a set of works with a strong impact on regional integration and socioeconomic development. It consists of transport, energy and communications projects that promote regional connectivity and generate sustainable economic and social development for South America.

The effective dissolution of UNASUR, following the departure of most of its countries in 2018, weakened the institutional framework of IIRSA and has called into question the future of one of the most important integration mechanisms in South America. Nevertheless, the countries of the region continue, within their jurisdictions, to implement the main infrastructure projects that were born within the framework of IIRSA and that were later promoted from COSIPLAN, around the following axes: transport and logistics, air integration, ports and waterways, railway integration, telecommunications, border integration and development, trade integration and financing.

For 2017, COSIPLAN's project portfolio recorded a total of 562 projects with an estimated investment of US$198.9 million, distributed as follows: an active portfolio composed of 409 projects with an estimated investment of US$150,405 million, and 153 completed projects for an investment of US$48,496 million. Regarding the territorial dimension of the projects, 83 percent of the projects in the portfolio were national, 16 percent binational, and 1 percent multinational. Anchor projects, i.e., those that generate synergies with others, reached an estimated investment of US$15,475 million, which implies 8 percent of the financial effort of the entire portfolio (UNASUR 2017).[30]

The project portfolio was mostly composed of transport and energy projects, which accounted for 72 and 28 percent of the estimated investment, respectively. The portfolio was largely financed by the public sector (almost 60 percent of the estimated investment), a quarter was financed by public-private initiatives, while the remaining 15 percent of the investment came from the private sector. The portfolio of 142 projects that are part of the Andean and Capricorn axes, which are the ones impacting the hotspot, reached an estimated total investment of US$43,992 million. The projects completed in the two axes represent a total investment of US$3948 million that would have been executed up to 2017.

Table 8.8 shows information on the IIRSA project portfolio in the two integration axes that are related to the hotspot. Further reference of the projects in the portfolio can be found in the latest report prepared by COSIPLAN in 2017, which has been the source of information in this section.

[30] South American Council for Infrastructure and Planning (COSIPLAN), Project Portfolio 2017. UNASUR. Quito, 2017.

Table 8.8 Selected IIRSA Road Projects and their Relationship with KBAs and Corridors within the Hotspot

Name	Projects and Estimated Investment in US$ billions	Potentially Impacted Corridors	Potentially Impacted KBAs
ANDEAN AXIS			
Venezuela (Norte Llanero Axis) - Colombia (Northern Zone) Connection	3 projects 2.0	Cordillera de la Costa Central	Parque Nacional Tirgua (General Manuel Manrique) (VEN30) Parque Nacional Macarao (VEN10) Parque Nacional San Esteban (VEN13) Valle de San Salvador (COL113) Cuchilla de San Lorenzo (COL28) Parque Nacional Henri Pittier (VEN9) Parque Natural Nacional Sierra Nevada de Santa Marta y Alrededores (COL110)
Venezuela (Caracas) - Colombia (Bogota) - Ecuador (Quito) current route Connection	10 projects 3,181.50	Cordillera de la Costa Central Cotopaxi-Amaluza Norte de la Cordillera Oriental Cordillera Central Andes Venezolanos Noreste de Quindío Awá-Cotacachi-Illinizas	Reservas Comunitarias de Roncesvalles (COL95) Haciendas Ganaderas del Norte del Cauca (COL43) Bosques de Tolemaida, Piscilago y alrededores (COL9) Valle de Guayllabamba (ECU74) Refugio de Vida Silvestre Pasochoa (ECU55) El Ángel - Cerro Golondrinas y alrededores (ECU31) Fusagasuga (COL39) Vereda Las Minas y alrededores (COL119) Parque Nacional Henri Pittier (VEN9) Parque Nacional El Ávila y alrededores (VEN2) Serranía de los Yariguíes (COL102) Parque Nacional El Tamá (VEN6) Bosques Secos del Valle del Río Chicamocha (COL12) Rocas de Suesca (COL136) Salinas de Ibarra (ECU93) Rabanal (COL134)

			Parque Nacional Cotopaxi (ECU48)
Venezuela (Orinoco-Apure Axis) - Colombia (Bogotá) III (low altitude corridor) Connection	5 projects 37.3	Cordillera Oriental-Bogotá Norte de la Cordillera Oriental	Parque Nacional El Cocuy National (COL64) Cañón del Río Guatiquía (COL16)
Pacific - Bogota - Meta - Orinoco - Atlantic Connection	4 projects 2,048.00	Cordillera Oriental-Bogotá Paraguas-Munchique-Bosques Montanos del Sur de Antioquia Noreste de Quindío	Cañón del Río Combeima (COL15) Humedales de la Sabana de Bogotá (COL44) Reserva Natural Laguna de Sonso (COL89) Región del Alto Calima (COL80) Bosques de Tolemaida, Piscilago y alrededores – (COL9) Reserva Forestal Yotoco (COL83) Cuenca del Río Toche (COL32) Bosques de la Falla del Tequendama (COL8) Cañón del Río Guatiquía (COL16)
Colombia (Tumaco port) - Ecuador (Esmeraldas-Guayaquil port) - Peru (Panamerican Highway) Connection	20 projects 20,771.20		
Colombia - Ecuador II Connection (Bogota - Mocoa - Tena - Zamora - Palanda - -Loja)	5 projects 496.4	La Victoria-La Cocha-Sibundoy Norte de la Cordillera Oriental en Ecuador Podocarpus Sangay	Cordillera de Huacamayos-San Isidro-Sierra Azul (ECU25) Alrededores de Amaluza (ECU6) Agua Rica (ECU4) Conchay (ECU83)
Peru - Ecuador II Connection (Loja - Integration Bridge - Yurimaguas)	2 projects 146.7	Condor-Kutukú-Palanda	Zumba-Chito (ECU79) Colambo-Yacuri Protected Forest (ECU11) Jaen-Bellavista (PER105)
Peru - Bolivia Connection (Cusco - La Paz - Tarija - Bermejo)	4 projects 1,079.60	Tarija-Jujuy	Reserva Biológica Cordillera de Sama (BOL26) Laguna Umayo (PER55) Ramis y Arapa (Lago Titicaca, sector peruano) – (PER76) Lago Titicaca (sector boliviano) (BOL20)

Capricorn Axis			
Antofagasta - Paso de Jama - Jujuy - Resistencia - Formosa - Asunción	25 projects 5,132.70	Tri-national Puna	Reserva Nacional Los Flamencos - Soncor – (CHI10) Quebrada del Toro (ARG37)
Salta - Villazón - Yacuiba - Mariscal Estigarribia	9 projects 899.60		Lagunas Runtuyoc - Los Enamorados (ARG20) Quebrada del Toro (ARG37)
TOTAL	**87 projects** **33,795**		

Source: COSIPLAN-UNASUR, 2017

8.5 Indigenous Territories and Land Rights

Rights over territories, lands and natural resources are fundamental aspects for indigenous peoples, Afro-descendants and local communities, since territory is a privileged space where the right to self-determination and autonomy is exercised. Precisely because of their importance, the guarantees of territorial rights constitute the cornerstone for the design of policies, plans and programs that comprehensively guarantee a set of fundamental collective rights so that communities can develop their own agendas in line with national development plans.

In general terms, there has been a growing recognition of indigenous peoples and their rights in Latin American constitutions during the last four decades. Each country's approach is different: Chile does not formally recognize indigenous peoples; Colombia and Peru recognize them as subjects of protection and include specific norms for the protection and participation of native communities; Argentina recognizes indigenous peoples as subjects of a limited set of rights, addressing specific issues such as education in the corresponding indigenous language, special land ownership regimes, and preventive and sanitation plans in indigenous communities; and Bolivia, Ecuador and Venezuela recognize them more comprehensively as collective subjects of rights (FILAC 2019).

To specifically verify the content, depth, robustness and integrity of the recognition of indigenous territorial rights in the constitutions, ECLAC (2020) uses eight criteria to establish the degree of progress in the region (Table 8.9).

Table 8.9 Constitutional Recognition of the Territorial Rights of Indigenous Peoples

Criteria/ Countries	Argentina	Bolivia	Chile	Colombia	Ecuador	Peru	Venezuela
Recognition of the Collective Nature of Land Ownership	X	X		X	X	X	X
Recognition of the Original Nature of Indigenous Property Rights	X	X			X		X
Special Land Protection	X	X		X	X	X	X

Demarcation and Titling of Indigenous Lands		X		X			
Expansion of Indigenous Lands	X	X					
Control of Natural Resources Available on Community Lands	X	X		X	X		X
Travel Prohibitions					X		
Autonomy in Indigenous Territories		X		X	X	X	

Source: ECLAC 2020.

Regarding land demarcation and titling, as the main mechanism that guarantees the territorial rights of indigenous peoples, Argentina has registered 1,687 communities, but has only surveyed of 38.6 percent of them. Some 18.7 percent are in the process of demarcation and no property has been titled. In Bolivia, a total of 12.5 million hectares were titled by 2019. In Colombia, 767 indigenous reserves have been legalized, with an approximate extension of 32.6 million hectares. In Peru, of 6020 *campesino* and indigenous communities, 78 percent were titled as of 2019, encompassing an area of 21.2 million hectares.

In general, there is a gap in the implementation of the state’s obligation to demarcate, title and clean up indigenous lands, the main mechanism to make these rights effective. Countries in the region have not adapted their regulatory and institutional frameworks to the standards of ILO Convention 169 on Indigenous and Tribal Peoples and the jurisprudence of the Inter-American Court of Human Rights.

As a result, indigenous peoples face multiple obstacles to the formalization of their land and territory tenure. Among these obstacles are the following: (a) in many countries, procedures are costly and inaccessible, and impose complex legal, technical and evidentiary requirements that are difficult to comply with; (b) state bodies impose delimitations that reduce community lands by not recognizing customary law as the basis for indigenous property; (c) the mechanisms for titling indigenous lands are usually more bureaucratic and complex than those defined for non-indigenous people, including companies; and (d) the absence of adequate mechanisms for regularization prevents the real exercise of constitutional rights (ECLAC 2020).

In the hotspot, protected areas and indigenous territories frequently overlap. The Sierra Nevada in Colombia exemplifies this often-tense relationship, as the area, which is also affected by the country's internal armed conflict, is both a national park and home to four indigenous groups (Kogui, Arhuacos, Wiwas and Kankuamos). There is a similar situation in the Chimanes, Mosetenes and Tacanas territories in Bolivia, where the Biosphere Reserve and Tierra Comunitaria de Origen Pilón Lajas overlap with the territory of these native groups.

Effective conservation in protected areas that overlap with native territories requires strategies that reconcile the aspiration for indigenous autonomy over their territories with national objectives and public conservation policies. The hotspot has been subject to interesting policy development processes and experiences. Under the Bolivian law, for example, all protected areas that overlap indigenous lands are subject to the principle of shared responsibility and management. CEPF's previous investment in the hotspot supported capacity building in several

KBAs, such as Bosque de Polylepis de Madidi (BOL5) y Yungas Inferiores de Pilón Lajas (BOL37) and in the Awá territories located along the border between Ecuador and Colombia. These experiences have generated important lessons for protected areas shared management through multi-stakeholder dialogue.

Despite these advances, under all national laws in the hotspot countries, subsoil resources are owned by the national government, limiting the effective authority of indigenous peoples over the extraction of hydrocarbons and minerals from their territories. Several KBAs and corridors experience this situation (e.g., the Trinational Puna Corridor shared by Argentina, Chile and Bolivia; the Tucumán Yungas Corridor in Argentina, the Condor-Kutukú-Palanda Corridor in Ecuador and Peru). National interests in infrastructure can cause conflicts with indigenous territories, as was the example of the construction of the TIPNIS highway in Bolivia, which would link the departments of Cochabamba and Beni, crossing the Isiboro Sécure Indigenous Territory and National Park.

Processes of prior consultation with indigenous peoples in the hotspot region are being applied with different understandings and with different levels of depth and effectiveness. These processes still need to be improved in order to strike a balance between state, corporate and community interests, as well as to guarantee the rights of indigenous peoples and local communities.

In general, consultation processes occur in a context of political and economic asymmetry. The underlying issue is that the development model that predominates in the region, with its focus on the exploitation of natural resources to generate short-term income, must migrate to long-term development, based on principles of sustainability and equity with nature, poverty alleviation, and recognition of human rights.

8.6 Conclusion

The political context in the Tropical Andes region presents multiple challenges for civil society organizations interested in biodiversity conservation. On the one hand, the renewal processes for presidents, vice presidents and parliamentarians in several countries in the region, between 2020 and 2021, occur at a particular moment in which at least three factors of concern converge: (a) the export slowdown starting in 2018 which put an end to the expansionary cycle initiated in 2016; (b) the crisis of political representation, corruption and low citizen credibility in democratic institutions; and (c) the health and economic crisis derived from COVID-19 that will cause a drop in around 9 percent of the regional GDP.

On the other hand, as a result of a series of economic and geopolitical interests at stake, previously vigorous regional integration processes have lost all dynamism and many of them have fallen into inaction. In this scenario, several regional agreements in favor of biodiversity conservation have also lost attention and many of them remain a legitimate aspiration of national governments. In addition to the unresolved political conflicts within several of the hotspot countries, there are massive mobilizations of an indignant and empowered civil society, which demand profound changes in the states' neoliberal model and public policy management.

Furthermore, as a result of the polarization in regard to the extractive industry, especially mining, the social, political and safety climate in certain KBAs in the hotspot has become particularly complex. Multiple reports of persecution and even assassination of environmental leaders highlight how serious the current situation in the region really is. However, even in the midst of uncertainty, examples of civil society organizations having a positive impact on biodiversity conservation, particularly in local settings, demonstrate that there is significant room for CEPF, its partners and allied organizations to act.

9 CIVIL SOCIETY CONTEXT OF THE HOTSPOT

9.1 Introduction

CEPF's strategy is based on strengthening the capacity of civil society and improving its impact on biodiversity conservation. 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), academic and research institutions, citizen networks and collectives, producer associations, small businesses and entrepreneurial undertakings linked to biodiversity conservation and social organizations, especially those of indigenous peoples.

CSOs have played an important role in environmental matters in the countries of the Tropical Andes. However, there are limited published studies that systematically and thoroughly analyze institutional capacity to influence the environmental agenda. Most of the publications of this nature are focused on various topics related to sustainable development, citizen participation, democracy, governance and environmental governance. Therefore, the information generated through 28 interviews with relevant stakeholders in the region, surveys in all hotspot countries and four national workshops with representatives of civil society in Colombia, Ecuador, Peru and Bolivia, has been used as the basis for the preparation of this chapter.

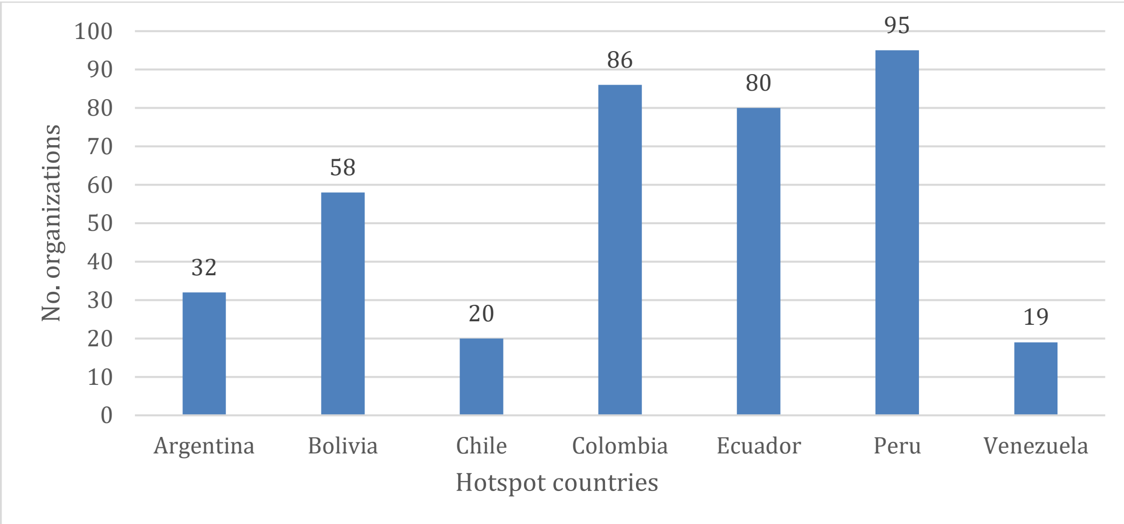
This chapter offers an analytical look at the most dominant regional trends of the last five years that have influenced the operation of CSOs linked to biodiversity conservation in the hotspot, particularly their capacity to organize, mobilize and generate dialogue (Fleming 2017). These elements are fundamental in guiding CEPF's intervention in the coming years, in view of the need to create enabling conditions that contribute to the sustainability of CSOs.

The chapter is organized in four sections. The first introduces the environmental CSOs working in the hotspot; the second presents an overview of the operating environment for CSOs, with particular emphasis on CEPF's investment priority countries for the coming years: Colombia, Ecuador, Peru and Bolivia; the third section summarizes a qualitative assessment of CSOs' capacities to positively influence conservation in the hotspot; and finally, the chapter concludes with a synthesis of findings.

9.2 Characterization of Civil Society Actors and Networks in the Environmental Sphere

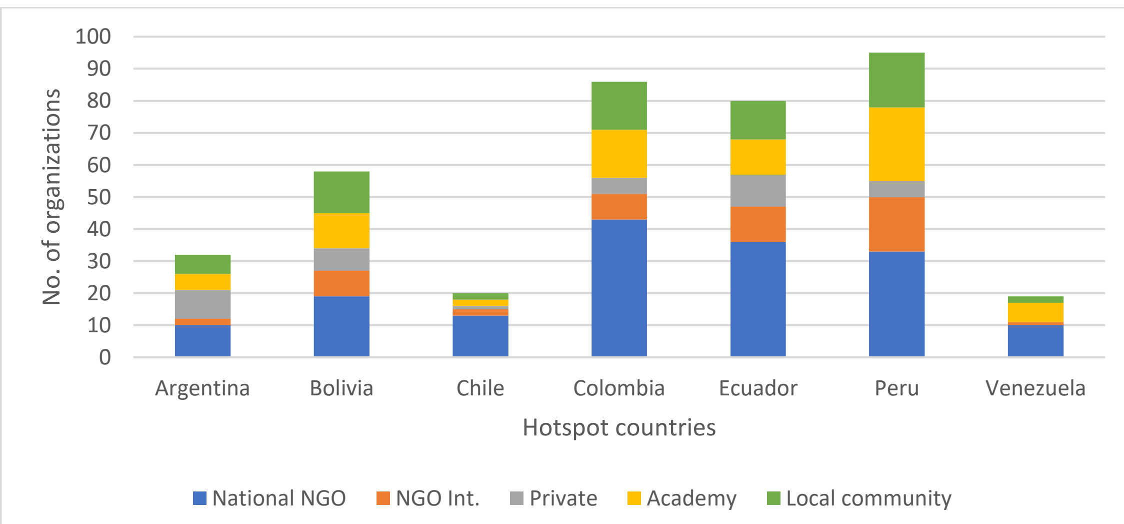
In the 2015 ecosystem profiling process, some 300 civil society organizations working in the Tropical Andes were identified, although it was stated that "... there are many more operating at the local level or on related issues" (CEPF 2015). Indeed, in light of what CEPF defines as civil society, there are certainly several hundred indigenous and campesino organizations in the hotspot, including associations, cooperatives and microbusinesses. In other words, given that this is a region historically inhabited by a population that has made social organization one of its strongholds, it is likely that there is a much larger number of CSOs in the hotspot. During the ecosystem profile update, 390 organizations were identified, with Ecuador, Colombia and Peru registering the highest number, as shown in Figures 9.1 and 9.2. In relative terms, the national NGOs working in the hotspot constitute an important support base for conservation work.

Figure 9.1 Number of Civil Society Organizations Identified in Hotspot Countries (Total = 390)



Source: 2020 consultation process.

Figure 9.2 Types of Civil Society Organizations Identified in Hotspot Countries (Total = 390)



Source: 2020 consultation process.

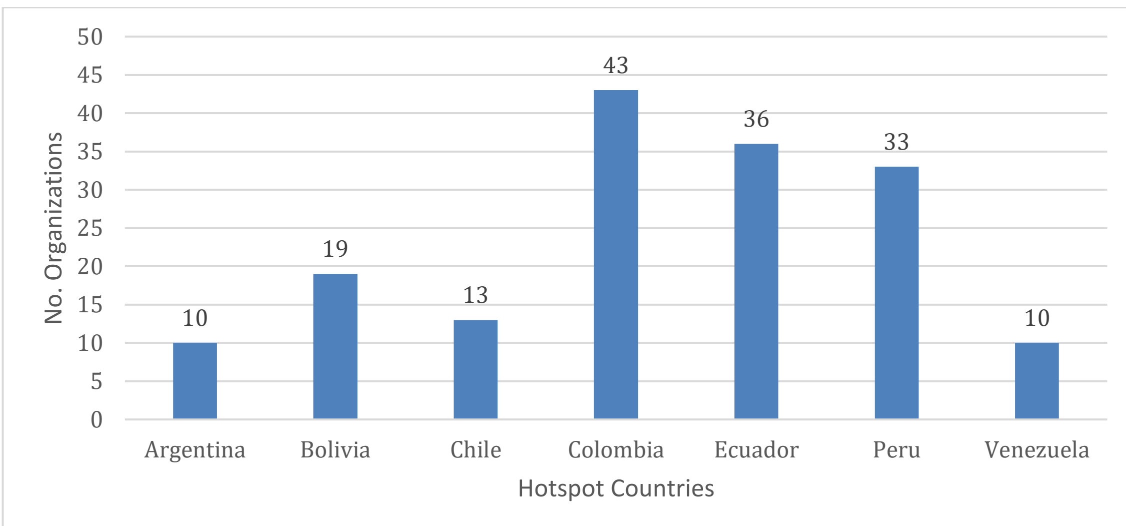
9.2.1 Non-Governmental Organizations, Networks and Citizens' Collectives

The ecosystem profile prepared in 2015 provides a historical overview of the emergence and evolution of environmental NGOs. Trends in NGO performance in the hotspot are presented below in order to highlight the progress made in the last five years.

Several of the national organizations that were created more than twenty years ago, such as *Fundación Natura* in Colombia, *Ecociencia* in Ecuador and the *Sociedad Peruana de Derecho Ambiental - SPDA* in Peru, continue to be key actors in their national contexts. On the other hand, organizations created in recent years offer a renewed perspective in terms of approaches, methodologies and use of tools, especially technological ones (e.g., LOGYCA/INVESTIGACIÓN in Colombia; BYOS in Ecuador; LIBÉLULA in Peru or ENERGÉTICA in Bolivia).

A total of 164 national and subnational environmental NGOs, networks and citizen collectives have been identified in the hotspot, 30 more than were identified in the previous ecosystem profile. Their distribution by country and organizational type is presented in Figure 9.3 and Table 9.1. The increase in the number of organizations cannot necessarily be associated with greater dynamism in the sector. As noted in the 2015 ecosystem profile, these organizations focus on traditional activities of ecosystem conservation and restoration, sustainable production, research, KBA management, and endangered species protection. Fewer organizations focus on emerging areas, such as the exploration of genetic resources, climate change adaptation and mitigation, or biodiversity economics. Matters related to the promotion of intersectoral dialogue, political advocacy, environmental governance, conflict management, sustainable finance, promotion of rights, citizen oversight, environmental justice, among others, are scarcely addressed.

Figure 9.3 Number of Environmental NGOs Identified in the Hotspot (Total = 164)



Source: 2020 consultation process.

Peru has the largest number of civil society organizations (see Figure 9.1), but ranks third in terms of the number of environmental NGOs (see Figure 9.3). Colombia, on the other hand, ranks second in terms of the number of civil society organizations and is the country with the largest number of environmental NGOs.

Table 9.1 National and Subnational Environmental NGOs Identified in the Hotspot

Argentina
Fundación para el Desarrollo en Justicia y Paz -FUNDAPAZ, Greenpeace*; Fundación Vicuñas; Camélidos y Ambiente -VÍCAM, 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
Asociación Civil Armonía, Asociación Boliviana para la Investigación y Conservación de Ecosistemas andino-Amazónicos-ACEAA, Asociación Huellitas; Centro de apoyo a la gestión sustentable del agua y medio ambiente "Agua Sustentable", Centro de Estudios en Biología Teórica y Aplicada-BIOTA, Cioec Bolivia, Fundación Amigos de la Naturaleza – FAN, Fundación Conservación y Desarrollo Bolivia, Fundación MedMin, Nativa Bolivia-Naturaleza, Tierra y Vida, Fundación Natura Bolivia, Fundación para el Desarrollo del Sistema Nacional de Áreas Protegidas (FUNDESNAP), Fundación para el Periodismo, Fundación para el Desarrollo Productivo y Financiero PROFIN, Fundación TRÓPICO, Liga de Defensa del Medio Ambiente -LIDEMA, Plataforma Boliviana frente al Cambio Climático and Red de Investigadores en Herpetología-Universidad Pública de El Alto.
Chile
Así Conserva Chile, Casa de la Paz, Chile Sustentable, CODEFF, Fundación TERRAM, Parque Katalapi, Sendero de Chile, 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 and Proyecto para Servicios Ecosistémicos -ProEcoServ.
Colombia
Asociación para el Desarrollo Campesino -ADC, Asociación para el Estudio y Conservación de las Aves Acuáticas en Colombia -Calidris, Asociación Río Cali, Asoriobravo, CENSAT Agua Viva - Amigos de la Tierra Colombia, Centro de Investigación de Producción Agropecuaria Sostenible -CIPAV, Corporación Autónoma Regional de las Cuencas de los Rios Negro y Nare -Cornare, Corporación Ambiental y Forestal del Pacifico -CORFOPAL, Corporación para la Gestión Ambiental Biodiversa, Corporación Salvamontes, Corporación Serraniagua, Corporación para el Desarrollo de Versalles -Corpoversalles, Corporación Socio Ecológica para el Futuro de Bolívar -Ecofuturo, Fondo Acción, Fondo para la Acción Ambiental y Niñez, Fondo Patrimonio Natural, Fundación Agrícola Himalaya, Fundación Ambiental DapaViva, Fundación Conserva, Fundación Ecohabitats, Fundación Ecológica Cafetera -FEC, Fundación Ecológica Fenicia Defensa Natural, Fundación Ecológica Los Colibríes de Altaquer -FELCA, Fundación Ecotonos, Fundación Ecovivero, Fundación Farallones, Fundación Ecológica Fedena, Fundación Humedales, Fundación Merenberg, Fundación Natura, Fundación para la Conservación del Patrimonio Natural de Colombia, Fundación para la Conservación y el Desarrollo Sostenible (FCDS), Fundación para la Defensa del Interés Público, Fundación ProAves, Fundación Pro-Sierra Nevada de Santa Marta, Tropenbos Colombia, Fundación Trópico, Fundación Botánica y Zoológica de Barranquilla -FUNDAZOO, Maestros del Agua, Corporación Paisajes Rurales and Asociación Red Colombiana de Reservas Naturales de la Sociedad Civil -Resnatur, Red ABC (Agua, Biodiversidad y Clima).
Ecuador
Asociación de Bosques y Páramos para la Vida Imbabura, Estación Científica Los Cedros, Naturaleza y Cultura Internacional, Fundación Jambatu-Centro Jambatu de Investigación y Conservación de Anfibios, Fundación Heifer Ecuador, Corporación Toisán, Mancomunidad del Chocó Andino, Fundación Alternativa para el Desarrollo Sustentable en el Trópico -ALTRÓPICO, Fundación

Ecológica Arcoiris -FAI, Fundación Ecuatoriana para la investigación y conservación de las aves y sus hábitats (Aves y Conservación), Centro de Derechos Económicos y Sociales -CDES, Coordinadora Ecuatoriana de Agroecología -CEA, Centro de Educación y Promoción Popular-CEPP, Fundación Central Ecuatoriana de Servicios Agrícolas-CESA, Fundación Ecuatoriana de Estudios Ecológicos-Ecociencia, Corporación de Gestión y Derecho Ambiental (Ecolex), Fundación Ecominga, Fundación Cóndor Andino, Fundación Zoológica del Ecuador, Fundación Botánica de los Andes, Fundación Jatun Sacha, Fundación Maquipucuna, Fundación Maquita Cushunchic -MCCH, Corporación Oikos, Fundación Pachamama, Fundación Paisajes Sostenibles -PASOS, Corporación Nacional de Bosques y Reservas Privadas del Ecuador, Grupo Nacional de Certificación Forestal Voluntaria CEFOVE-FSC, CEDENMA, Fundación de Conservación Jocotoco, Fondo Ecuatoriano Populorum Progressio -FEPP, Mindo Cloudforest Foundation, CONDESAN, Consorcio TICCA, Fundación Futuro Latinoamericano -FFLA, Fondo de Inversión Ambiental Sostenible -FIAS.
Peru
Aldea Yanapay, Amazónicos por la Amazonia -AMPA, Asociación de Conservación de la Cuenca Amazónica -ACCA, Asociación de Producción y Desarrollo Sostenible -APRODES, Asociación de Promoción y Desarrollo "El Taller", Asociación Ecológica del Sira - ECOSIRA, Asociación Ecosistemas Andinos - ECOAN, Asociación Especializada para el Desarrollo Sostenible -AEDES, Asociación Interétnica de Desarrollo de la Selva Peruana -AIDESEP, Asociación para la Investigación y Desarrollo Integral -AIDER, Asociación Peruana para la Conservación de la Naturaleza -APECO, Asociación Proyecto Mono Tocón, Avisa – Sociedad Zoológica de Fránkfurt Perú -FZS Perú, Centro de Conservación, Investigación y Manejo de Áreas Naturales -CIMA, Centro de Estudios Andinos Regionales "Bartolomé de las Casas"-CBC, Centro de Estudios para el Desarrollo Regional -CEDER, Centro de Estudios y Promoción del Desarrollo-DESCO, Centro de Investigación y Desarrollo Selva Alta -CEDISA, Centro de Ornitología y Biodiversidad -CORBIDI, Centro Guamán Poma de Ayala, Derecho, Ambiente y Recursos Naturales -DAR, Estudios Amazónicos -URKU, Instituto de Cultivos Tropicales ICT, Fondo de las Américas -FONDAM, Fundación Peruana para la Conservación de la Naturaleza - PRONATURALEZA, GRUPO GEA, Grupo SEPAR, Instituto de Desarrollo y Medio Ambiente -IDMA, Instituto del Bien Común -IBC, PROVIDA, Red de Conservación Voluntaria de Amazonas -Red AMA, Sociedad Peruana de Derecho Ambiental -SPDA and Yunkawasi.
Venezuela
Asociación Venezolana para la Conservación de Áreas Naturales -ACOANA, Acción Campesina, Fundación Programa Andes Tropicales, Geografía Viva, Tatuy, Cátedra de la Paz y Derechos Humanos "Mons. Oscar Arnulfo Romero", ConBiVe, Fundación Tierra Viva, Provita, Fundación La Salle.

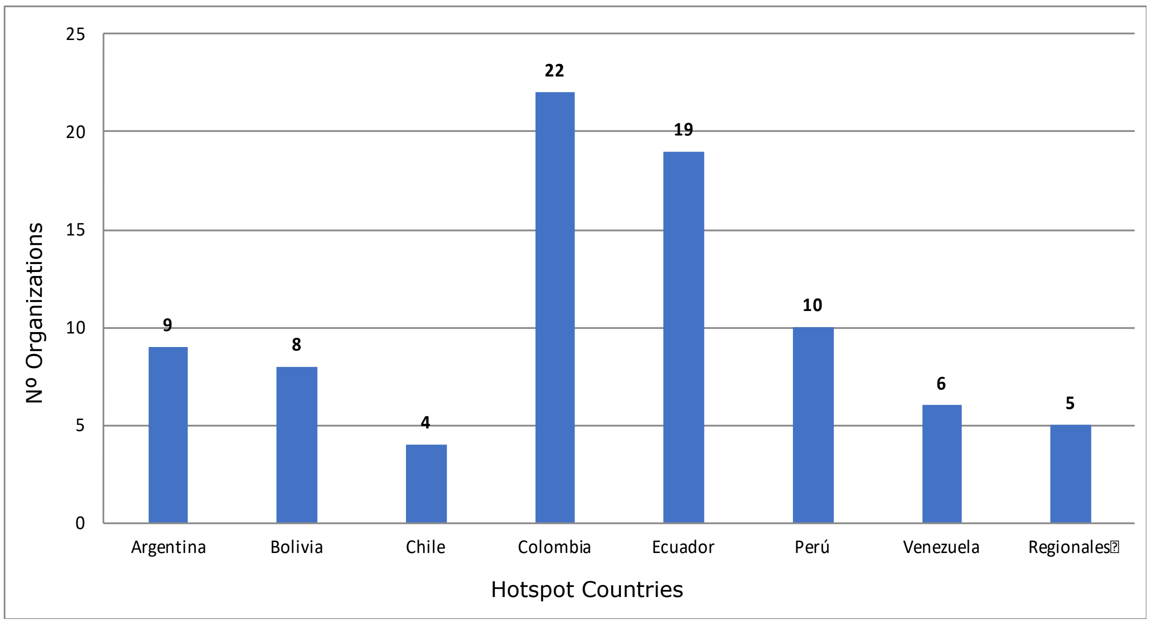
In relative terms, Colombia (43), Ecuador (36) and Peru (33) have the largest communities of NGOs, networks and citizen collectives working on environmental issues. Despite this, it is not yet possible to say that a robust institutional fabric has been formed within the sector that offers opportunities for scaling up, sustainability and impact of conservation investments. On the contrary, there are still several challenges and limitations to consider. One of them is related to the wide variation in 'NGOs' technical and financial resources, as discussed below.

Citizen Networks and Collectives

Eighty-three citizen networks and collectives have been identified in the hotspot countries (Figure 9.4.). These groups are an expression of civil society's capacity to mobilize in order to achieve common goals. The advancement of extractive industries policies, mainly for mining, has triggered the mobilization and coming together of social organizations and civil society collectives (Table 9.2).

Formal networks include those promoted by governments and those linked to particular initiatives (e.g., REDD working groups in Peru and Ecuador; national committees on wetlands, threatened species); those associated with protected areas such as management committees (e.g., biosphere reserve networks in Bolivia, Argentina, Ecuador); and those that connect private stakeholders and NGOs (e.g., Resnatur in Colombia, National Voluntary Certification Group (*Grupo Nacional de Certificación Voluntaria* – CEFOVE) in Ecuador. However, there are also many informal voluntary networks that are not generally recognized under national regulations but play a role in information exchange and capacity building (e.g., working groups and rural entrepreneurship networks). There are also five regional networks that are active and work on the following themes: environmental funds management; collective rights, social and environmental sustainability; climate action; conservation and sustainable use of Amazonian ecosystems and monitoring of climate change impacts on biodiversity in the High Andes.

Figure 9.4 Number of Networks and Citizen Collectives Identified in Hotspot Countries (Total = 83)



Source: 2020 profile update.

Table 9.2 Citizen Networks and Groups Identified in the Hotspot

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 campesino communities of the Puna and Quebrada de Jujuy, *Espejo de Sal*, network of community and indigenous organizations to promote sustainable tourism, *Red Agroforestal* with more than 15 organizations that promote agroforestry production in the provinces of Salta and Jujuy, *Redes Chaco*, a network of networks that coordinate NGOs, community organizations, private sector and research centers promoting sustainable development in the Chaco biome, *Grupo Promotor de la Reserva de Biosfera Yungas*, a multi-

stakeholder forum established for the sustainable and collaborative management of the *Reserva de Biosfera de las Yungas*, *Red Nacional de Áreas Protegidas Privadas*, coordinated by *Fundación Vida Silvestre*, *Red de Reservas de Biosfera*, coordinated by *Comité MAB*.
Chile
Red Flamencos, network of flamingo researchers in Chile, Bolivia, Argentina and Peru, *Comités de Gestión Pública de Humedales*, government-led networks of wetland researchers, *Comités de Gestión Pública de Biodiversidad*, government-led networks, *Red Alianza Gato Andino*, research network focused on the Andean cat.
Bolivia
Liga de Defensa del Medio Ambiente -LIDEMA, a network of 27 environmental organizations present in nine departments in Bolivia, *Plataforma Boliviana de Acción Frente al Cambio Climático*, *Red de Investigadores en Herpetología - Universidad Pública de El Alto*, *Coordinadora de Integración de Organizaciones Económicas Campesinas, Indígenas y Originarias de Bolivia -CIOEC-BOLIVIA*, *Coordinadora de Organizaciones No Gubernamentales Internacional - CONGI*, *GIT Oro responsable*, *Central de Pueblos Indígenas de La Paz* -CPILAP, joins indigenous peoples, *Comité impulsor del turismo y conservación ambiental*.
Colombia
Red de Organizaciones de la Sociedad Civil con Reservas Naturales - RESNATUR, with more than 280 members throughout the country, *Red de Agricultura Sostenible*, *Red Nacional de Productores Certificados por Rainforest Alliance*, *Red de organizaciones por el Agua*, linked to *CENSAT-Agua Viva*, which promotes sustainable watershed management, *Red de Custodios de Semillas* with community organizations in the Colombian Massif, *Red de Alter Extractivismo*, opposed to extractive activities, *Red de Consejos Comunitarios del Pacífico Sur - RECOMPAZ*, with Afro-descendant organizations mainly in the Chocó region, *Red de Turismo Sostenible*, promotes exchange and good practices in sustainable tourism, with a large number of members throughout the country (community operations, medium and large operations), *Red por la Conservación del Cerro San Antonio*, *Comité de Conservación de la Oophaga lehmanni*, *Comité de trabajo por el Páramo del Duende, Comité de trabajo por la Serranía de los Paraguas*, Alliance for Zero Extinction (AZE), *Red de Observadores de Aves del Piedemonte Costero de Nariño*, *Paraguas-Munchique-Bosques Montanos del Sur de Antioquia* and Awá-Cotacachi-Illinizas corridors' KBA network, Group of organizations working for the protection of environmental leaders in the Nariño lowlands, *Red de Iniciativas de Conservación de Piedemonte Andino Costero Nariñense*, *Corredor de Vida de la Gran Familia Awá Binacional*, *Mesa Técnica del ACB-Bosque de San Antonio*, *SIDAP Del Valle*, *Mesa Técnica del ACB COL7*, eight organizations.
Ecuador
Coordinadora Ecuatoriana de Organizaciones para la Defensa de la Naturaleza y el Medio Ambiente - CEDENMA, Grupo Nacional de Trabajo sobre Certificación Forestal Voluntaria -CEFOVE, *Mancomunidad de la Bioregión del Chocó Andino - MCA, Corporación TOISÁN*, *Colectivo Caminantes*, Ecuador's national network of private forest owners (*Corporación Nacional de Bosques Privados del Ecuador*), Multi-stakeholder REDD+ Roundtable Working Group convened by the *Ministerio de Ambiente y Agua*, Consorcio TICCA, *Initiativa Regional de Monitoreo Hidrológico de Ecosistemas Andinos - IMHEA*, a network of public, private and mixed technical-scientific and management entities, coordinated by CONDESAN and the *Grupo de Ciencias de la Tierra y Ambiente of the Universidad de Cuenca*, with eight academic partners from Bolivia, Colombia, Ecuador, Peru, *Plataforma de investigación y monitoreo de la biodiversidad en la region sur del Ecuador*, *convenio de la Fundación Alemana para la Investigación (DFG)* in coordination with Ecuadorian universities and organizations such as NCI, *Fondo Regional de Agua – FORAGUA, Fondo del Agua para la Conservación de la cuenca del rio Paute -FONAPA*, RED JASE, Red de Jovenes del Chocó Andino, the Network of rural entrepreneurs, Network of rural women, RedBio, a platform for articulation between academia, society and government, to put forward proposals based

on research, *Grupo de Trabajo de anfibios en el Corredor de Conectividad Sangay Podocarpus*, *Grupo de Trabajo de conflictos fauna-gente en el Corredor de Conectividad Sangay Podocarpus*, *Grupo de Trabajo para la Conservación del Cóndor Andino*, *Grupo de Trabajo para la Conservación de las Aves Rapaces de Ecuador*.
Peru
Red de Conservación Privada y Comunal para San Martín, network of NGOs and community organizations linked to conservation initiatives in the San Martin region, Grupo REDD+ Perú, national working group on REDD+ issues, with participation of civil society, public sector and private sector, *Mesa REDD de San Martín*, multi-stakeholder forum for discussion of REDD+ initiatives in the region, *Mesa REDD de Madre de Dios*, *Comisiones Ambientales Regionales*, multi-stakeholder forums led by the *Consejos Ambientales Nacionales* for discussion of environmental policies at the regional level, *Red de Áreas de Conservación Privada Amazonas*, network of private protected areas in the Amazon region, Red Muqui, network of national and local civil society organizations in areas affected by mining activities, *Red de Conservación Voluntaria de Amazona s -RED AMA*, made up of individual and communal voluntary conservation initiatives in the Amazon region, *Red de ciencia ciudadana para la Amazonía*, *Red de Áreas de Conservación Voluntaria del Cusco.*
Venezuela
Red de Aliados para la Sinergia en la Gestión Ambiental del Estado Lara, communication network for government and non-governmental environmentalists working in the state of Lara, *Asociación de Productores Integrales del Páramo - PROINPA*, network of producers in Mérida, Colectivo Mano a Mano, informal coalition working in agroecology, *Red de Centros de Ciencia, Tecnología y Educación Ambiental - CCTEA*, network of research, technology and environmental centers linked to the Ministry of Education, *Red Social de Cooperación Andina*, network of 12 organizations in Táchira, Mérida and Trujillo, promoted by Uniandes, Red ARA, network of non-governmental organizations working at the national and subnational levels.
Regional Networks
Red de Fondos Ambientales de América Latina - REDLAC, *Red Amazónica de Información SocioAmbiental Georreferenciada -RAISG,* a network of environmental organizations that generate, exchange and disseminate maps and other geospatial data on the Amazon, focused on strengthening collective rights, social and environmental sustainability, *Plataforma Climática Latinoamericana - PCL,* a network of researchers and NGOs working on issues related to climate change, with more than 25 members throughout Latin America, *Articulación Regional Amazónica - ARA Regional*, a Pan-Amazonian network composed of national Amazonian networks (national ARAs) aimed at reducing deforestation as a mechanism to mitigate the effects of climate change and impacts on biodiversity, including other dimensions of the social, environmental, and cultural problems of Amazonian ecosystems, GLORIA-Andes Andean Monitoring Network, formed by institutions from Argentina, Bolivia, Colombia, Ecuador, Peru and Venezuela, created to monitor and document the impact of climate change on biodiversity in the High Andes and facilitate the analysis and exchange of information.

The national consultation workshops highlighted the importance of developing the potential of citizen networks and collectives, as well as advancing the design of a long-term strategy that promotes collaborative work with a view to achieving the "graduation" of organizations with respect to the support they receive from CEPF in the hotspot. This recognition comes from the 'organizations' need to build social resilience in the face of increasing threats that jeopardize the stability of natural, economic and socio-ecological systems.

International Environmental NGOs

International NGOs and cooperation agencies have made contributions to the fulfillment of international commitments, such as the CBD Strategic Plan for Biodiversity 2011-2020 and the Aichi Targets, and to the implementation of the various resolutions adopted at several conventions and protocols, such as RAMSAR, CMS, and the Man and the Biosphere Program of the United Nations Educational, Scientific and Cultural Organization (MAB-UNESCO). The contribution of international CSOs has been vital, both for the financial support provided and the technical assistance given. Their successful track record highlights the importance of NGOs as partners in conservation efforts, although, as mentioned earlier in this chapter and described in Chapter 11 on current conservation investment, the financial gap in meeting global conservation targets is widening.

The worldwide recognition of the Tropical Andes as a biodiversity hotspot of high importance has promoted the increased participation of at least 24 international organizations (Table 9.3.) that, in alliance with national and local organizations, have achieved significant results: increased effectiveness of protected area management; landscape approaches to biodiversity management; ecosystem monitoring and response to climate change; reduction of threats to wild populations of endangered species; implementation of adaptation measures and sustainable land management; economic incentives for conservation, including mechanisms for payment and reimbursement for ecosystem services.

Table 9.3 Key International Environmental NGOs Identified in the Hotspot (Total = 24)

Country	Name of Organization
Bolivia	Conservation International (CI), Conservation Strategy Fund (CSF), The Nature Conservancy (TNC), Wildlife Conservation Society (WCS), World Wildlife Fund (WWF), Nature Serve, Panthera, Fundación CODESPA and Fundación AVINA.
Colombia	Audubon, Conservation International (CI), Rainforest Alliance, The Nature Conservancy (TNC), Wildlife Conservation Society (WCS), World Wildlife Fund (WWF), Rare and Panthera.
Ecuador	American Bird Conservancy, BirdLife International, Conservation International (CI), International Union for Conservation of Nature (IUCN)/South, Rainforest Alliance, The Nature Conservancy (TNC), Nature & Culture International (NCI), Fundación AVINA, Fauna & Flora International (FFI), CONDESAN, World Wildlife Fund (WWF), Wildlife Conservation Society (WCS).
Peru	CARE, CARITAS, Conservation International (CI), Frankfurt Zoological Society (FZS), Rainforest Alliance, Wildlife Conservation Society (WCS), World Wildlife Fund (WWF), Practical Action, CONDESAN, Nature & Culture International (NCI), Forest Trends, Helvetas, Panthera, and Rainforest Alliance.
Venezuela	The Nature Conservancy (TNC).

Indigenous Peoples and Community Organizations

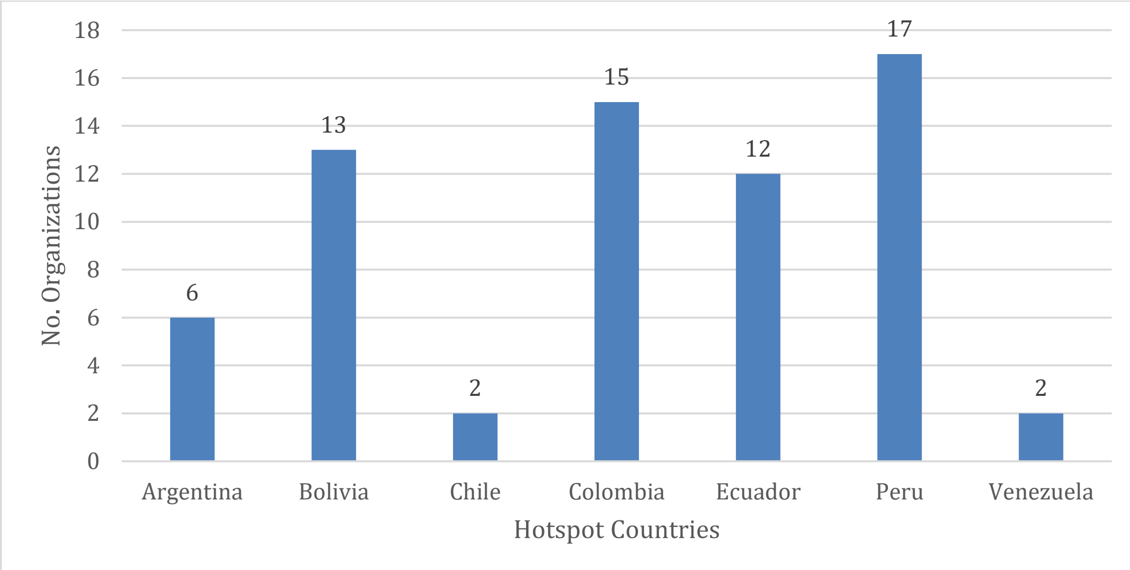
The forms of organization of indigenous communities, peoples and nationalities in the hotspot reflect a diversity of cultures, visions, interests and survival strategies. However, interculturality, plurinationality and self-determination continue to be the main axes of political action of indigenous movements and community-based organizations in the hotspot. The social struggle has added a new meaning to these axes, mainly linked to the defense of territories against the advance of extractive natural resources models (chiefly minerals), which puts nature and people's lives at risk.

The historical, territorial and cultural base that nurtures the organizational life of indigenous peoples and nations has been key in guiding, sustaining and strengthening the efforts of NGOs and institutions concerned with the deterioration of natural resources, biodiversity loss and climate change. The convergence of agendas of environmental and indigenous peoples' organizations has led to successful implementation of emblematic initiatives such as the Amazonia 2.0 Project (implemented by IUCN and its allies in Brazil, Colombia, Ecuador, Guyana, Peru and Suriname), and the *Adaptación a los Impactos del Cambio Climático en Recursos Hídricos en los Andes – AICCA* project, implemented by the *Corporación Andina de Fomento -CAF* and executed by CONDESAN in Bolivia, Colombia, Ecuador and Peru.

The Tropical Andes Hotspot offers abundant examples of shared management of protected areas, protection of water sources, sustainable land management, biodiversity monitoring with the active participation of indigenous and local communities. In countries such as Bolivia, Ecuador, Colombia and Peru, the overlap between protected areas and indigenous territories has tested the capacity for dialogue between governments and local communities to develop common agendas and design instruments for collaborative natural resource management. Thus, a number of multilevel governance mechanisms—such as management committees, roundtables, platforms and networks—offer lessons that have inspired other countries. For example, the Consejo Regional T'simane Mosetene (CRTM) of the Reserva de Biosfera Pilón Lajas, supported by CEPF, is an inspiring example of indigenous-led governance in a protected area. In Ecuador, the work carried out by the Corporación Toisán on biodiversity conservation and promotion of sustainable development initiatives in the Intag Valley, with CEPF's support, also provides positive lessons in participatory territorial management.

In the hotspot sections of the seven countries, a total of 67 second and third degree community and indigenous organizations were identified (e.g., federations and confederations) (Figure 9.5 and Table 9.4). This figure is only for reference, as there could be several hundred community-based organizations (first degree) in the hotspot.

Figure 9.5 Number of Community and Indigenous Organizations Identified in the Hotspot (Total = 67)



In terms of the number of community organizations, of second and third degree mainly, Peru ranks first, followed by Colombia, Bolivia and Ecuador. Although these figures are merely indicative, it is well-known that there is a limited number of community and indigenous organizations in Venezuela and Chile that work directly within the hotspot.

Table 9.4 Community and Indigenous Organizations in the Hotspot

Country	Main Scale of Action	Name of Organization
Argentina	National	*Organización Nacional de Pueblos Indígenas de la Argentina - ONPIA.*
	Subnational	*Asambleas de los Pueblos Guaraníes (in the provinces of Tucumán, Jujuy, Salta), Asociación Diaguita de Tucumán, Comunidades de Valle de Tafí, Consejo de Organizaciones Aborígenes de Jujuy COAJ, indigenous and local communities in Rinconada.*
Bolivia	National	*Confederación de Pueblos Indígenas del Oriente Boliviano - CIDOB.*
	Subnational	*Central Indígena de Mujeres Lecas de Apolo -CIMLA, Central Indígena del Pueblo Leco de Apolo -CIPLA, Central de Pueblos Indígenas de La Paz -CPILAP, Consejo Indígena del Pueblo Tacana -CIPTA, 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 and Comunidades Originarias de Larecaja-PILCOL.*

Chile	Subnational	*Consejo Nacional Aymara (in the provinces of Iquique, Arica and Parinacota)*
Colombia	National	*Proceso de Comunidades Negras -PCN, Consejo Territorial de Cabildos, Organización Nacional Indígena de Colombia -ONIC, Organización Nacional de los Pueblos Indígenas de la Amazonía Colombiana-OPIAC.*
	Subnational	*Asociación de Desarrollo Campesino del Norte del Cauca -ARDECAN, Consejo Regional Indígena del Cauca -CRIC, Resguardos Indígenas de Arhuaco, Kogui-Malayo-Arhuaco y Kankuamo; Unidad Indígena del Pueblo Awá -UNIPA -Resguardo El Gran Sábalo; Asociación de productores agroecológicos del municipio de San José del Palmar Choco-ASOPALMAR, Organización Gonawindua Tayrona - Resguardo Kogui Malayo Arhuaco; Organización Wiwa Golkushe Tayrona; Resguardo Palmar Imbi -CAMAWARI, Resguardo Pialapí Pueblo Viejo - Reserva Natural la Planada, Asociación para el Desarrollo Campesino, Asociación de Autoridades Tradicionales and Cabildos Indígenas Awá.*
Ecuador	National	*Confederación de Nacionalidades Indígenas del Ecuador -CONAIE; Confederación Nacional de Organizaciones Campesinas, Indígenas y Negras- FENOCIN; Consejo de Pueblos y Organizaciones Indígenas Evangélicos del Ecuador -FEINE; Federación Ecuatoriana de Indios -FEI.*
	Subnational	*Confederación de Pueblos de la Nacionalidad Kichwa del Ecuador -ECUARUNARI, Confederación de Nacionalidades Indígenas de la Amazonía Ecuatoriana -CONFENIAE, Confederación de Nacionalidades Indígenas de la Costa Ecuatoriana -CONAICE, Federación de Centros Awá del Ecuador-FCAE, Federación de Centros Chachi del Ecuador- FECCHE, Federación Interprovincial de Centros Shuar -FICSH, Nacionalidad Shuar del Ecuador-NASHE, Pueblo Shuar Arutam -PSHA.*
Peru	National	*Confederación Nacional Agraria -CNA; Confederación de Nacionalidades Amazónicas del Perú-CONAP, Organización Nacional de Mujeres Indígenas Andinas y Amazónicas del Perú -ONAMIAP, Asociación Interétnica de Desarrollo de la Selva Peruana -AIDESEP.*
	Subnational	*Comité de Gestión de Bosques in Cuzco; Comunidades Indígenas, Nativas y Campesinas Washipaeri, Ashsaninka, Matshigenka; Organización de comunidades Awajun in the Cordillera del Cóndor -ODECROFOC, Organización de Mujeres Kichwas chocolateras "Chocowarmi"; Gobierno Territorial Autónomo de la Nación Wampis -GTANW, Organización Regional de Pueblos Indígenas de la Amazonía Norte del Perú -ORPIAN-P, Coordinadora de Desarrollo de los Pueblos Indígenas de la región San Martín -CODEPISAM, Asociación Regional de Pueblos Indígenas de la Selva Central -ARPI-SC, Consejo Machiguenga del Río Urubamba-COMARU, Federación Nativa del Río Madre de Dios y Afluentes-FENAMAD, Mujeres Shawi artesanas textiles y ceramistas; Asociación de Sectoristas Villa Cadena; Asociación Camanti Sostenible.*

The nature of these organizations, which are closely linked to community management of natural resources, has been the main strength of sustainable biodiversity conservation and management processes promoted in the hotspot. These organizations' technical capacities have also improved in recent years thanks, in part, to the opportunities generated by national and regional projects that have emphasized training, experience exchange, leadership training and participation in international forums. Socio Bosque in Ecuador is one such national initiative; examples of regional projects include EcoAndes in Peru and Ecuador and Amazonia 2.0 in Brazil, Colombia, Ecuador, Guyana, Peru and Suriname.

It is important to mention the experience of the *Coordinadora de las Organizaciones Indígenas de la Cuenca Amazónica COICA*, an indigenous international organization that focuses its efforts on the promotion, protection and security of indigenous peoples and territories through the defense of their ways of life, principles and values. The political presence of COICA and other organizations has revolved around the vindication of the right to self-determination and self-government of their territories. As in the case of the process of discussion of the autonomous statute being carried out by the Wampis nation in Peru. The path taken by these organizations in the last five years has been complex, marked by opposition, disinterest and even persecution, so that the full exercise of their collective rights is still a pending task.

Frequently, certain public bodies and trade organizations label the struggle of indigenous peoples as "anti-mining", thus dismissing their historical demand for the construction of plurinational and intercultural states that manage public policies "with" and "from" the peoples and nations. Consequently, the influence of these organizations on the public policy agenda in the hotspot continues to be limited, especially in decisions regarding the expansion of extractive industries and the management of its associated social and environmental risks.

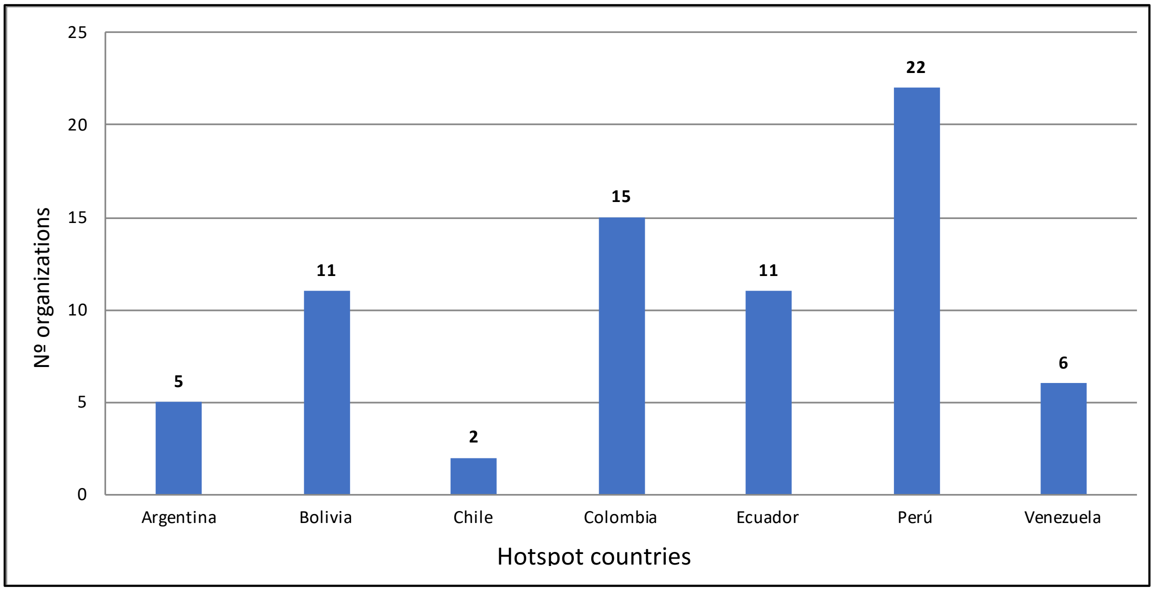
There are several points of convergence and collaboration between indigenous organizations and NGOs, especially in relation to protected areas that overlap with indigenous territories. In all countries, there are lessons learned on how to promote governance systems that reconcile conservation objectives with demands for territorial autonomy. These lessons can inspire others through experience and best practices exchanges, as well as through regional cooperation initiatives. However, governance practices in protected areas that overlap with indigenous territories need new analytical frameworks and capacities that enable the full exercise of the collective rights of peoples and nations.

Several community and indigenous organizations deserve recognition for their work in conservation, some of which are Phase II CEPF partners, such as the Serraniagua Corporation in the *Parque Nacional Natural Tatamá* (COL74) in Colombia, the Kichwa organizations in the Reserva de Biosfera Sumaco Napo Galeras, the Shuar organizations in Parque Nacional Podocarpus (ECU50), and the Awá Federation near the Reserva Ecológica Cotacachi-Cayapas in Ecuador (ECU61). The exchange of lessons learned among organizations in the hotspot could enrich their conceptual and methodological approaches.

Academia

There is a significant amount of knowledge and scientific capacity in academic institutions, universities and research centers in the hotspot. During the ecosystem profile update process, 73 major universities and research centers working on biodiversity-related research in the hotspot were identified (Figure 9.6 and Table 9.5).

Figure 9.6 Number of Universities and Research Centers Identified in the Hotspot (Total = 72)



Source: Stakeholder consultations conducted in 2020.

Table 9.5 Universities and Research Centers Identified in 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	*Instituto de Ecología, Universidad Mayor de San Andrés -UMSA, Herbario Nacional de Bolivia, Museo de Historia Natural Alcides D'Orgbigny, Centro de Biodiversidad y Genética, Universidad Mayor de San Simón – Cochabamba, Universidad de La Serena, Universidad Mayor de San Andrés; Universidad Mayor de San Francisco Xavier, Colección Boliviana de Fauna, Herbario Chuquisaca - Universidad San Francisco Xavier, Herbario Nacional de Bolivia, 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 Estudios 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, Universidad de Antioquia; Universidad de la Guajira, Universidad de los Andes, Universidad del Magdalena, Universidad de Medellín, Universidad de Nariño, Universidad del Atlántico, Universidad del Quindío, Universidad ICESI Valle del Cauca, Universidad Javeriana, Universidad La Salle de Bogotá and Universidad del Tolima.*

Ecuador	*Universidad de Cuenca, Universidad del Azuay, Universidad Nacional de Loja, Universidad Técnica Particular de Loja, Universidad Técnica del Norte, Universidad Andina Simón Bolívar, Universidad de las Américas, Universidad San Francisco de Quito, Universidad Católica del Ecuador, Universidad Yachay, Universidad Estatal Amazónica, Universidad Politécnica Salesiana, Universidad Tecnológica Indoamérica, Universidad Regional Ikiam, Instituto Nacional de Biodiversidad -INABIO.*
Peru	*Biodiversity Institute of Kansas University; Smithsonian Institution; Missouri Botanical Garden; Museo de Historia Natural de San Marcos -MHN-UNMSM, Universidad Andina/Cuzco, Universidad Católica San Pablo/Arequipa, Universidad Católica Santa María/Arequipa, Universidad Católica Sedes Sapientiae, Universidad Cayetano Heredia, Universidad Cesar Vallejo, Universidad Científica del Sur, Universidad de Amazonas, University of Texas-Austin, Universidad de Jaén, Universidad Nacional Agraria La Molina, Universidad Nacional de Madre de Dios, Universidad Nacional de San Agustín/Arequipa, Universidad Nacional de San Antonio Abad/Cuzco, Universidad Nacional de San Martín, Universidad Nacional Hermilio Valdizán, 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: Stakeholder consultations conducted in 2020.

The lack of an efficient regulatory and institutional framework and necessary resources makes it difficult to keep information on biodiversity up to date at the national and regional levels. In recent years, hotspot countries have built significant capacity to narrow knowledge gaps and to contribute to national conservation strategies. All countries have strengthened their national biodiversity databases, and some of them, such as Colombia and Ecuador, have made substantial progress in structuring national biodiversity information systems. Some countries have strengthened research networks and built coordination instruments despite duplication of research efforts and a lack of coordination, which was identified as a worry trend in 2015. Examples of research networks include Ecuador's National Biodiversity Research Agenda established in 2017, Peru with its 2021 Environmental Research Agenda, and Colombia with its XXI Century Systematics Research Agenda.

Key challenges, such as conducting research to inform policy decisions, improving NGO-led experiences and projects, and inspiring innovative practices in companies, remain. Strengthening research networks, communication and coordination with other sectors and stakeholders would help generate and apply scientific knowledge more effectively. There are several universities and centers with extensive expertise in biodiversity research that could lead collaborative initiatives and knowledge transfer, including the Alexander von Humboldt Institute in Colombia and the *Universidad Nacional Agraria La Molina-UNALM* in Peru.
In addition to national universities and research centers, it is important to highlight the work of the Missouri Botanical Garden, the New York Botanical Garden, the Biodiversity Institute of the University of Kansas and the Smithsonian Institution. These institutions have a long history in hotspot countries and have made significant contributions to knowledge about species and ecosystems through their partnerships with local universities and research organizations.

Private Sector and Producer Associations

Although the current situation seemingly offers better conditions for the private sector to demonstrate greater leadership in environmental matters, its participation in recent years has been limited. This is because there is still a need to develop business leadership capacities to incorporate new approaches and environmental and sustainable development strategies and practices. In relation to meeting the Sustainable Development Goals (SDGs), the debate about the role of the business sector is linked to poverty eradication objectives and how businesses can adopt environment and climate compatible practices, in the production of goods and services.

Despite this, there are some relevant examples of partnerships between civil society and the private sector. Among them is the CI-Ecuador partnership with Lundin Gold in 2016 to develop and implement a "sustainable landscape partnership" that contributes to the conservation of biodiversity and ecosystem services in the area of influence of *Fruta del Norte* mining project in the southern Ecuadorian Amazon. Another relevant alliance is the one led by Wildlife Conservation Society -WCS since 2016, with financial support from CEPF, to form the *Grupo Interinstitucional de Trabajo en Oro Responsable -GITOR,*[31] with the participation of 12 civil society and academic institutions, in coordination with the *Federación Regional de Cooperativas Mineras Auríferas -Ferreco*, the *Federación de Cooperativas Mineras Auríferas del Norte de La Paz -Fecoman* and the *Federación Departamental de Cooperativas Mineras de La Paz -Fedecomin-LP*.

Other small-scale private initiatives linked to the implementation of REDD+ mechanisms in Peru and Ecuador are related to biocommerce and sustainable bio-entrepreneurship. Precisely in this field, CEPF has made investments in community ecotourism and avitourism, which have not only contributed directly to strengthening CSOs in the hotspot, but also contributed significantly to the conservation of KBAs (see Chapter 7). In Ecuador, for example, the *Corporación Microempresarial Yunguilla*, developed a sustainable community tourism proposal and implemented a project to strengthen community management of the *Área de Conservación y Uso Sustentable Yunguilla – Santa Lucía*, with CEPF's support. Similarly, in Colombia, CEPF supported the promotion of ecotourism and agrobiodiversity in the Alto Calima Region (COL80) and Parque Natural Regional Páramo del Duende (COL75). In Peru, Avisa - Frankfurt Zoological Society Peru (SZF Peru) developed and implemented a participatory strategic tourism plan in Kosñipata-Carabaya (PER44) (Acjanaco - Atalaya tourism corridor in the western sector of the Kosñipata KBA). They also established and trained a network of local tourism operators and enterprises in the same corridor.

Producer organizations and associations - including farmers, ranchers, tourism operators - have a significant presence in the hotspot and great potential for the implementation of biodiversity conservation strategies. For this reason, international organizations such as Rikolto are working to transform value chains and strengthen small-scale agriculture organizations and food chain actors in the Tropical Andes.

Some cases stand out, such as the Bosque de Protección Alto Mayo in the San Martin region, in northern Peru, where coffee-producing communities received support from Disney's Climate Solutions Fund, through CI, to promote sustainable coffee cultivation. Since 2013, this company developed forest carbon offset actions, becoming an excellent example of a public-private collaborative REDD+ project. Currently, new initiatives have emerged in the *San Martin* region, such as the Alliance for Sustainable and Competitive Coffee project, which seeks to coordinate main actors in order to implement sustainable production practices, improve management, governance and foster associations that contribute to the implementation of the National Plan for Peruvian Coffee 2019-2030. The participation of the National Coffee Board and the Peruvian Chamber of Coffee and Cocoa, with the support of Solidaridad and the World

[31] The *Grupo Interinstitucional de Trabajo Oro Responsable -GITOR* is a voluntary alliance between civil society and academic institutions working in Bolivia, that seeks to promote the Responsible Gold approach as a strategy to reduce negative social and environmental impacts of current gold mining activities.

Agroforestry Center (ICRAF), in alliance with the Regional Government of San Martin (GORESAM by its acronym in Spanish), also stand out.

In Colombia, where there is a strong tradition of associations, industry associations (e.g., the National Federation of Coffee Growers, FEDECAFE by its acronym in Spanish) have strong institutional capacity and are involved in several programs, including certification initiatives with Rainforest Alliance and previous CEPF support in the Tumbes-Choco-Magdalena Hotspot. There are sustainable cattle ranching initiatives led by the Federation of Colombian Cattle Ranchers (FEDEGAN by its acronym in Spanish), which has a strong partnership with the NGO CIPAV that works in the Cordillera Central of Colombia. FEDEGAN has a national goal of returning 10 million hectares of marginal pastureland to nature while improving productivity through more biodiversity-friendly silvopastoral systems. This would illustrate the potential synergies between improved production systems and conservation in Colombia. On the other hand, the National Association of Cocoa Exporters demonstrates the degree of agroindustrial and commercial development of this sector within a framework of social responsibility and environmental care.

Table 9.6 shows some of the producer organizations identified in the hotspot. However, this list is only for reference, as there are probably several dozens of productive organizations, many of which work quietly on issues related to sustainable natural resources management and biodiversity conservation. Table 9.7 includes some of the conservation initiatives identified in the hotspot in which the private business sector participates.

Table 9.6 Producer Associations Identified in the Hotspot with Initiatives linked to Conservation

Country	Producer Associations
Argentina	*Asociación Forestal e Industrial de Jujuy, Asociación de Obrajeros de Orán, Instituto de Cultura Popular -INCUPO, Organización de la Ruta 81, ProGrano and Asociación de Turismo Comunitario Las Queñoas -ATUCOQUE.*
Bolivia	*Artisans affiliated to CIPLA, Asociación de Turismo Comunitario Pacha Trek; Asociación Ecoturística de Agua Blanca, Asociación de Productores de Coca-ADEPCOCA/Yungas, Asociación de Productores de Cacao -APCAO Mapiri y Apolo; Asociación de Productores de Café de Apolo -APCA, Asociación Turística Comunitaria Lagunillas; Shade Grown Coffee Producers affiliated to CIPLA, Incense producers affiliated to CIPLA, Cámara Regional de Turismo del Destino Rurrenabaque Madidi Pampas, Asociación de Organizaciones de productores Ecológicos de Bolivia, Central de cooperativas El Ceibo, Federación de Cafetaleros Exportadores de Bolivia -FECAFEB, Coordinadora de Integración de Organizaciones Económicas Campesinas -CIOEC, Asociación de Organizaciones de Productores Ecológicas de Bolivia -AOPEB.*
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; ISAGEN; Mesa de Ganadería Sostenible de Colombia -MGS-Col, Asocomore, Asociación de campesinos agroecologicos in the buffer zone of the Parque Natural Regional del Duende ASODUENDE, Fundación Cipav, Asociación de productores Agroecológicos -ASOPALMAR, Asoagroambiental Santa Clara, Asociación de Productores de Río Bravo -ASORIOBRAVO, Asofruteros Trujillo, Asociación Comunitaria de Productores de Mora y demás cultivos de la región -ASOCOMORE, Anturios del Pacífico Grupo de mujeres artesanas tejedoras de shigras en tiempo de paz.*

Ecuador	*Asociación de Operadores Turísticos del Noroccidente de Pichincha, Asociaciones de Productores de Cacao, Asociaciones de Productores de Café; Juntas de riego y Juntas administradoras de agua; Asociación Ecuatoriana de Industriales de la Madera -AIMA, Asociación Ecuatoriana del Cacao Nacional Fino de Aroma -ACEPROCACAO, Asociación Nacional de Exportadores de Cacaco -ANECACAO, WIKIRI; Soluciones Ambientales BYOS, Corporación Microempresarial Yunguilla -CMY, Alianza por el Emprendimiento y la Innovación -AEI, PACARI, VERDECANANDE S.A., PROFAFOR; ALLPABAMBU, Federación Regional de Asociaciones de Pequeños Cafetaleros Ecológicos del Sur del Ecuador -FAPECAFES, Asociación de Caficultores Rio Intag -AACRI.*
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 (Cusco), Comités de Gestión de Áreas Protegidas, Empresa Stevia, Mesa Centro de las empresas mineras, Área de Conservación Privada Fundo Cadena, Área de Conservación Privada Santuario de la Verónica, HERPIRO S.A.C - Titular de la Concesión con fines de Conservación SOQTAPATA, Asociación Nacional de Ejecutores de Contratos de Administración del Perú -ANECAP, Iniciativa Interoceánica Sur -ISur, Cooperativas Agrarias Cafetaleras de los Valles de Sandia -CECOVASA, Cooperativa de Servicios Múltiples -CAPEMA, CENFROCAFE (Cajamarca y Amazonas), APROCASSI (San Ignacio y Jaén), APROECO (Moyobamba).*

Table 9.7 Conservation Initiatives involving the Private Sector in the Hotspot

Country	Description
Argentina	- Fundación Proyungas' initiatives are supported by companies in the agroindustrial sector (Ledesma, Arcor, San Miguel), hydrocarbons (Pan American Energy), forestry (Alto Paraná), air transport (LAN), supermarkets (Carrefour) and insurance (Allianz).
Bolivia	- Plataforma Piensa Verde Led by Conservation Strategy Fund -CSFand *Asociación Boliviana para la investigación y conservación de ecosistemas andino-amazónicos -ACEAA*, seek greater commitment from the private sector in conservation projects; *Fundación VIVA*, *Laboratorios Bagó de Bolivia S.A.*, *Banco de Crédito de Bolivia - BCP* and *Farmacias Chávez* are participating. - *Fundación Natura* and the Coca Cola Foundation develop projects for watershed conservation. - WCS has promoted the Interinstitutional Working Group on Responsible Gold (*Grupo Interinstitucional de Trabajo en Oro Responsable - GITOR*), with the participation of 12 civil society and academic institutions, and in coordination with the *Federación Regional de Cooperativas Mineras Auríferas -FERRECO*, *la Federación de Cooperativas Mineras Auríferas del Norte de La Paz -FECOMAN* and the *Federación Departamental de Cooperativas Mineras de La Paz* -Fedecomin–LP.

Colombia	- Federación Nacional de Cafeteros -FEDECAFE: Certification initiatives with Rainforest Alliance and previous CEPF support in Chocó. - Federación de Ganaderos Colombianos -FEDEGAN: Sustainable livestock farming initiatives with a strong alliance with CIPAV. - Asociación de Cultivadores de Caña de Azúcar de Colombia -ASOCAÑA: Restoration of important ecosystems for water preservation in partnership with TNC. - ISAGEN (hydroelectric generation company): Programa Conexión Jaguar, in alliance with South Pole and Panthera Colombia, to contribute to biodiversity conservation and climate change mitigation. - BANCOLOMBIA: support for the BANCO2 Program in alliance with the Corporación Autónoma Regional. It is a voluntary strategy of payment for environmental services, implemented since 2016 through which an incentive is delivered to farming families that have strategic ecosystems within their properties, and are willing to conserve them. The resources provided to these families come from a voluntary contribution made as carbon footprint compensation. - Arroz Blanquita: good (bird-friendly) practices in sugar production - reduction or zero use of agrochemicals in partnership with Asociación Calidris. - Ingenio Providencia (Ingenio Azucarero): forest reserve and support for research of the Cauca guan (Penelope perspicax, EN) together with Asociación Calidris.
Ecuador	- Management of water funds: Cervecería Nacional and Tesalia Spring Company (FONAG and FONDAGUA); Banco Bolivariano, CODEMET, MEXICHEM (FONDAGUA). - PRODUBANCO: green credit for the acquisition of a private reserve in the Corredor Awacachi (ECU28). - The National Association of Cocoa Exporters demonstrates the degree of agro-industrial and commercial development of this sector, within a framework of social responsibility and environmental care. - Sustainable landscape management in the southern Amazon (Morona Santiago): Lundin Gold in partnership with CI (2016). - Federación Regional de Asociaciones de Pequeños Cafetaleros Ecológicos del Sur -FAPECAFESsupports the conservation of the KBA Parque Nacional Podocarpus (ECU50). - Asociación Agroartesanal de Caficultores "Río Intag" (AACRI) supports the conservation of the KBA Reserva Ecológica Cotacachi Cayapas (ECU61).
Peru	- Disney's Climate Solutions Fund supports the conservation of the Bosque de Protección Alto Mayo where communities of coffee growers live. - *Junta Nacional del Café and Cámara Peruana del Café y Cacao*, with the support of ICRAF and APROECO (agricultural coffee exporting cooperative), supports the conservation of the KBA Moyobamba (PER65). - ISA REP (ISA group): company that finances jaguar conservation "jaguar connection" through economic mechanisms (carbon credits) with the support of Panthera.
Venezuela	- Polar Companies: The Fundación Polar supports the NGO Provita in the preparation of the Red Book of Venezuelan Fauna.

In the national consultation workshops, some CSO representatives mentioned how complex it is to manage the issue of illegal mining, given the increase in the price of gold, to the extent that the CSOs have visualized strategies to involve this sector further in order to get them to incorporate good environmental and social practices in mining operations.

Regarding the possibility of involving the business sector in corporate responsibility actions and support for conservation projects, according to CSO representatives, in the national workshops, there are two factors that require further development: negotiation capacities between CSOs and businesses in long-term associations; and enabling conditions to pique the private sector's interest in contributing to conservation. In fact, CSOs have not yet taken full advantage of companies and associations that work in coffee, cacao and non-timber forest products. Many of these companies and associations are located in areas of influence of corridors and KBAs, such as FAPECAFES in the Parque Nacional Podocarpus KBA (ECU50) and AACRI in the Reserva Ecológica Cotacachi KBA (ECU61) in Ecuador; or APROECO in the Moyobamba KBA (PER65) in Peru. This undoubtedly represents an opportunity for environmental CSOs in the hotspot, as biodiversity, ecosystem services and climate change could become links to addressing Sustainable Development Goals (SDGs) with the private sector.

9.3 Regulatory and Operational Framework for Civil Society Organizations

CSOs usually have methodologies or technical models to generate information, develop participatory work, establish networks with which they build standards or indicators, carry out social control and promote accountability. Therefore, CSO proposals tend to be more robust because of the research and the strength of social cohesion (Marín *et. al.* 2017).
The legal and operational framework within which CSOs are operating in the hotspot is presented below. Likewise, an analysis of trends and perceptions of the operation of CSOs in the coming years is presented.

9.3.1 Regulatory Framework

There are constitutional and legal frameworks that guarantee the work of civil society organizations in hotspot countries. In some cases, such as Peru, Colombia and Chile, the regulatory framework for establishing organizations is quite simple. In Ecuador and Bolivia, on the other hand, regulation is somewhat more demanding. All hotspot countries have government agencies in charge of registering CSOs, although there is not necessarily a formal process for monitoring and evaluating their performance. CSO registration in Ecuador is with the National Secretariat for Policy Management (*Secretaría Nacional de Gestión de la Política*); in Bolivia, with the Vice-Ministry of Autonomies of the Ministry of the Presidency (*Viceministerio de Autonomías del Ministerio de la Presidencia*); in Colombia, with the Chamber of Commerce; in Peru, with the National Superintendency of Public Registries (*Superintendencia Nacional de Registros Públicos*); and in Chile, with the Civil and Identification Registry of the Ministry of Justice and Human Rights (*Registro Civil y de Identificación del Ministerio de Justicia y Derechos Humanos*). Thus, the registration, monitoring and evaluation of CSOs responds to the administrative, political and institutional structure of each country.

The enforceability of rights of access to environmental information and access to justice in environmental matters is still weak. With the exception of Chile and Venezuela, all the countries that are part of the hotspot have adopted the Escazú Agreement (Regional Agreement on Access to Information, Public Participation and Access to Justice in Environmental Matters in Latin America and the Caribbean); however, only Ecuador and Bolivia have ratified it. In general, CSOs have been open and willing to share information on their activities. However, there have not always been formal accountability processes or spaces for citizen oversight and questioning of results and practices. It should be noted that, according to transparency and access to information laws, public institutions in each hotspot country are obliged to publish information, render an account of and submit their management practices to public scrutiny.

In all countries of the region, the work of CSOs tends to be better aligned with, and increasingly closer to, the priorities established in national development plans, as well as in sectoral public policy plans and agendas. This is desirable in any democratic system that recognizes the value of institutionalization and fosters complementarity between governmental and civil society efforts. This scenario has meant that CSOs have developed better capacities for dialogue and negotiation of interests, adapting their action frameworks to respond proactively to the nature, dynamics and challenges of public administration. Responsibility for foreign policy is exclusive to the Executive in all countries of the region; therefore, it is central government entities that register and monitor technical and financial cooperation, as they count as Official Development Assistance (ODA). The exception is decentralized cooperation, which is frequently channeled and registered directly with subnational governments.

As subnational and local governments strengthen their capacities and gain prominence in conservation efforts, the work of CSOs increasingly requires formal mechanisms for collaboration, as well as instruments that make such articulation feasible. Several multi-stakeholder platforms, often linked to protected area management and promoted by civil society, represent important models of participatory governance that could undoubtedly enrich public policy approaches, methodologies and proposals.

The presence of CEPF in Bolivia, Peru, Colombia and Ecuador offers a starting point for dialogue. Unlike decades ago, CSOs are now choosing to establish formal collaboration agreements with local governments to legitimize their presence in subnational jurisdictions and strengthen environmental governance processes. This practice, which in the past was perceived as bureaucratic, is now considered appropriate to strengthen democracy and transparency while enhancing governance and the sustainability of CSOs' actions.

9.3.2 Operational Framework

The overall context in which CSOs have operated in the last five years in the hotspot countries could be described as volatile, uncertain, complex and ambiguous (Truedge 2018). Transition in government administrations has not always meant continuity in biodiversity conservation initiatives within the hotspot. Thus, CSOs have had to adapt to maintain a presence in the region and generate advocacy in favor of biodiversity conservation in the hotspot.

An example of the above mentioned, is the dissolution of the Unión de Naciones Suramericanas (UNASUR), following the departure of most of its countries in 2018, due to differences among its members. This is emphasized given that the 2015 ecosystem profile highlighted the existence of the Consejo Suramericano de Infraestructura y Planeamiento (COSIPLAN), as a UNASUR body that promoted the construction of infrastructure, transport and telecommunications networks under sustainable social, economic and environmental development criteria. One such example is the Initiative for the Integration of Regional Infrastructure in South America (*Iniciativa para la Integración de la Infraestructura Regional Suramericana* - IIRSA) (see Chapter 8).

Corruption scandals at high levels of political power, as well as in the private sector, have stalled the progress needed for sustainable and inclusive development. This environment has exacerbated the crisis of governance and generated deep citizen distrust of political power and democratic institutions (OECD 2019). These scandals could become an opportunity to define better legal and administrative structures to implement joint activities between the national governments and the private sector in a transparent and honest way (Engel *et al.* 2018).

A large population of young people (millennials and centennials) have joined traditional organized groups of salaried, working class, campesino and indigenous civil society. They have become the protagonists of mobilizations in recent years while demonstrating civil society's capacity for collective action on a variety of issues. The defense of the rights of nature and the denunciation of the exploitation of natural resources are linked to society's demands due to a generalized perception of lack of progress, profound inequity in the distribution of wealth, violation of rights, violence, corruption and widespread dissatisfaction with the current democratic systems.

The global trade contraction between the end of 2018 and the beginning of 2019 has impacted the 'CSOs' operating capacity. The contraction was due primarily to two factors: falling commodity prices and weakening real demand from major advanced and emerging economies. Thus, CSOs in the hotspot have been affected by the progressive reduction of fiscal allocations in institutional budgets earmarked for biodiversity management, which has been reflected in the continuing reduction of public sector[32] workers and the slowdown of administrative and institutional processes.

In this environment of uncertainty, economic contraction and institutional fragility, international cooperation agencies began to play a fundamental role in financing conservation projects and mobilizing non-reimbursable resources, which allowed many CSOs to maintain their operations in the hotspot.

At the sectoral level, the exports most affected by the economic contraction are mining and oil. The value of these sectors plummeted by 15% in the first half of 2019, after having experienced a recovery in 2017 and 2018 (ECLAC, 2020). Several hotspot countries have revised their exploration and exploitation plans during the last few years, relaxing environmental regulations to maintain investment growth rates. This has occurred despite the opposition of local communities, social and environmental organizations to the risks associated with such operations (Dammert *et. al.* 2019). The tensions between those for and against large-scale industrial mining have led to an environment of insecurity and intimidation against social and environmental leaders. Such is the case of Colombia, where the highest number of leaders have been killed from 2015 to date. Some of these leaders were fighting against extractive megaprojects in their territories (Gonzales et al. 2018).

This is why the expansion of extractive industries in the Tropical Andes continues to be a challenge that highlights the need for civil society's collective action. The mining company coordination roundtables in Huánuco and Pasco in the Carpish-Yanachaga Corridor in Peru, in which CSOs participate, is an example of how civil society can strengthen its capacity to engage with industry. There is the need for similar action in Colombia, Ecuador and Argentina, where mining activities are an increasing threat (see Chapter 6). In Bolivia, Wildife Conservarion Society (WCS) has worked with three gold mining cooperatives in the Madidi-Pilón Lajas-Cotapata Corridor to achieve international standards for sustainable mining production, with CEPF funding. They have implemented safeguard measures in their operations and have conducted field schools on social and environmental impact mitigation for other mining operations.

Another strategy used to address mining expansion in the hotspot is the declaration of new protected areas. To this end, CEPF financed a project led by Fundación PRODECI, under which the Área de Conservación y Uso Sostenible Municipal Intag Toisán (ACUS-MIT) was established to prevent mining in the Intag-Toisán KBA (ECU34). It covers 126,968 hectares, including 21 water reserves and 7 protective forests,

[32] 289,000 people lost their jobs in the pandemic in Ecuador, retrieved from https://www.nodal.am/2020/08/ecuador-registra-mas-de-289-mil-despidos-durante-la-emergencia-por-la-pandemia/.

In the midst of this scenario, since the end of 2019, the world has had to face the consequences of COVID-19, which triggered a global crisis in the areas of health, economy and finance. The magnitude of the impact will depend on the duration of the pandemic, its spread and the prevention and response measures taken by countries to contain and ease its effects. It will also depend on the economic structure of countries in the region that are highly dependent on exports and international commodity prices. Thus, the prospects for economic recovery are uncertain, and much will depend on the decisions taken by governments (IDB 2020).

In summary, CSOs have been present and very active in the elaboration of environmental public policies, as well as in the implementation of plans, programs and projects promoted by government agencies and international cooperation agencies. This is why, in general, the role of CSOs in the hotspot countries is perceived as positive in terms of their achievements in biodiversity conservation and sustainable natural resource management. However, the ability of organizations to adapt and respond to the social demands and political processes that the region has experienced remains a major challenge.

9.3.3 Future Trends and Scenarios

Many of the hotspot countries have been categorized as middle-income countries based on per capita income. Consequently, a large portion of development aid resources has been redirected to low-income countries. In addition, the economic crisis in the main development cooperation countries and the change in strategic priorities has led to a reduction of funds to the region.

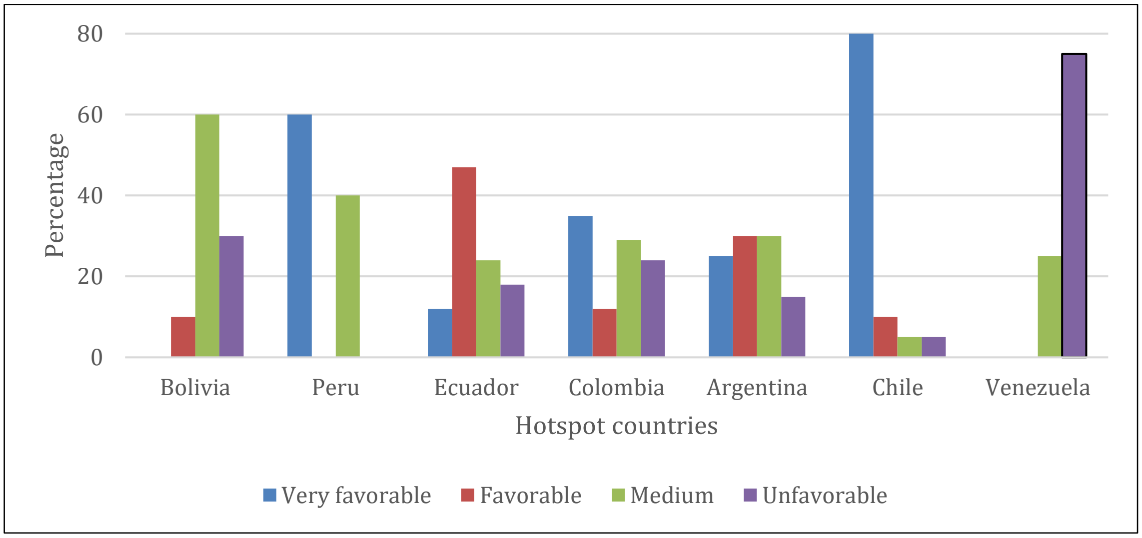
On the other hand, the international environmental institutional framework is complex, given the diversity of stakeholders involved and multiple spaces for coordination. Added to this are the challenges of environmental governance in the Andean region, specific to each country in the hotspot, where structural gaps in productivity, innovation, gender and environment persist. For this reason, the role of international cooperation continues to be key to strengthening civil society organizations. Notwithstanding CSOs' efforts to enhance their adaptive capacity in recent years, they need to continue making improvements in this area in order to implement high-impact initiatives as part of alliances and with greater involvement of the private sector.

As part of the process of the Tropical Andes Hotspot profile update during 2020, a series of surveys (146 respondents) and consultation workshops (268 participants) were conducted to assess perceptions regarding the operating environment of CSOs. The enquiry also sought to determine their willingness to contribute to public initiatives, implement joint actions and address citizen oversight processes, among other things. The findings are shared below.

9.3.4 Perception Analysis for the Operation of CSOs

According to stakeholders who participated in the consultation process during the ecosystem profile update, Chile and Peru offer more favorable environments for the legal incorporation and registration of CSOs (Figure 9.7). This perception is in line with the information on the regulatory framework presented above, which points to simpler constitutional and legal frameworks for establishing CSOs in Peru and Chile.

Figure 9.7 Operating Environment of CSOs



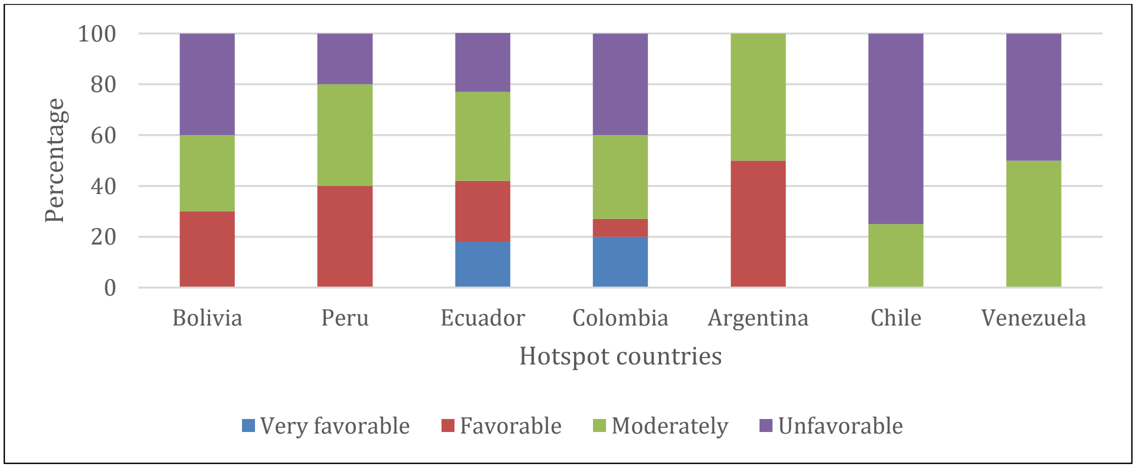
Source: 2020 consultation process.

Beyond the regulatory framework, there is a favorable environment for CSOs to contribute to biodiversity conservation and sustainable development through public dialogue that influences the public policy cycle. Although significant progress has been made in the region, with a favorable environment in several hotspot countries (e.g., Peru, Ecuador, Argentina), additional effort is still needed to achieve CSOs' full inclusion in the design and management of public policies for biodiversity conservation.

The public sector's openness to implementing conservation projects and initiatives in coordination with CSOs varies across hotspot countries. In Ecuador and Colombia, there are institutionalized and operational mechanisms that promote more joint work with CSOs (Figure 9.8). These include the citizen networks and collectives described above.

It is important to note that these results are strongly influenced by the current situation in the region, particularly in some of the countries where social mobilization has increased.

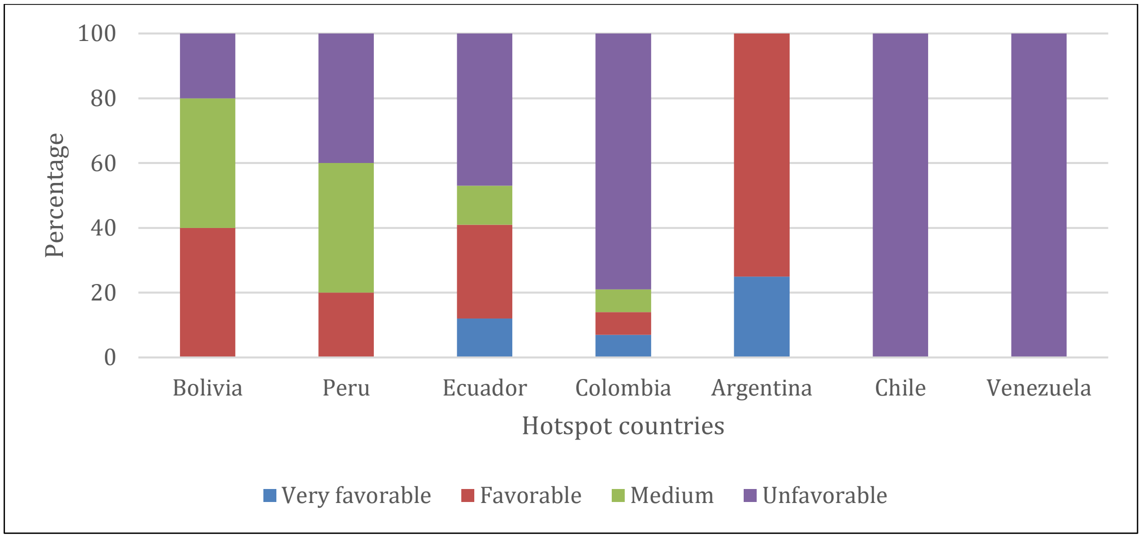
Figure 9.8 Institutionalized Mechanisms that Promote Coordinated Work with CSOs



Source: 2020 consultation process.

This is complemented by the security and citizen oversight guarantees, mainly in sensitive areas such as extractive industry and infrastructure development. Colombia shows a markedly unfavorable environment, while Bolivia and Peru are somewhat more favorable. Ecuador shows signs of an environment with greater security and guarantees for CSOs to intervene in oversight and social control processes (Figure 9.9).

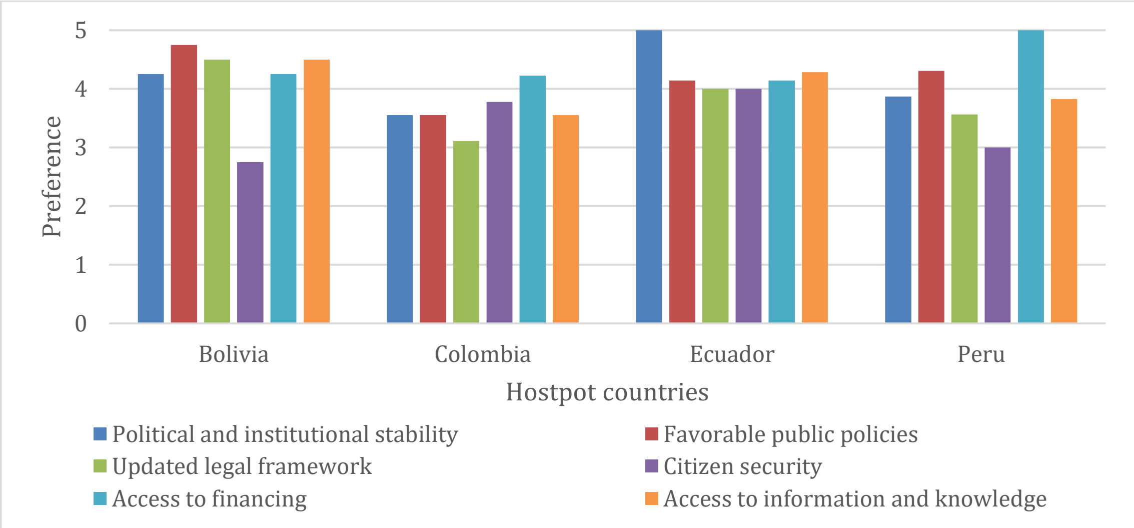
Figure 9.9 Security Environment and Guarantees for Social Oversight of Conservation Policies



Source: 2020 consultation process.

The national workshops made it possible to identify the aspects that CSOs perceive as fundamental for ensuring biodiversity conservation in the hotspot. For Ecuador, political and institutional stability stand out as the main factor. In Peru and Colombia, it is access to financing, and in Bolivia it is the existence of favorable public policies. (Figure 9.10).

Figure 9.10 Key Factors to ensure Biodiversity Conservation in the Hotspot

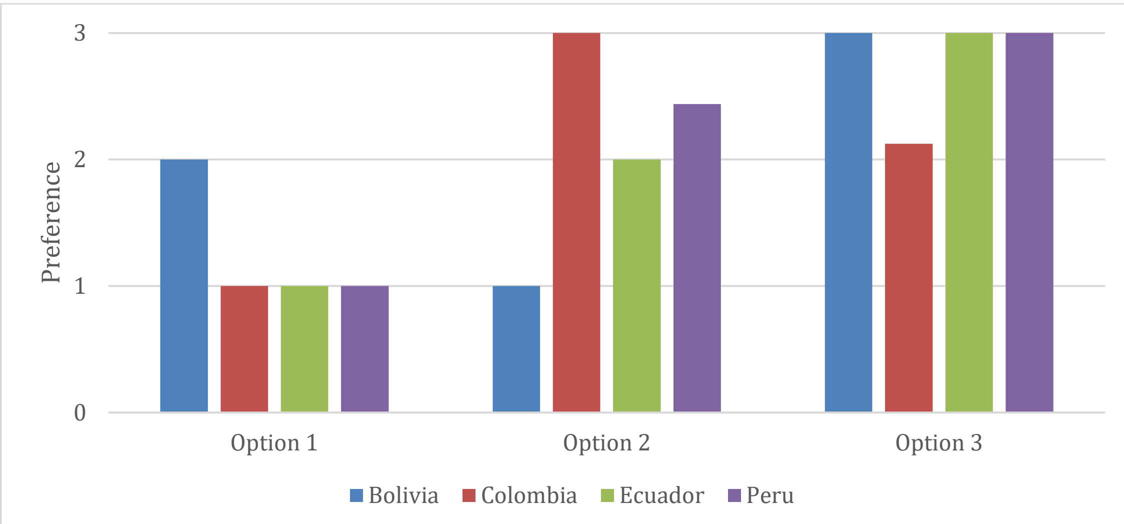


Source: 2020 consultation process.

Note: A value of 5 indicates a high preference, while a value of 1 indicates a low preference of the people who participated in the national consultation workshops.

When analyzing the strategies adopted by CSOs to address the conservation challenges in the hotspot, the different approaches of the organizations in the countries consulted are evident (Figure 9.11). There is a greater preference for constructing alternative development models (option 3), while dialogue and negotiation of interests (option 1) is the lowest priority among the alternatives considered.

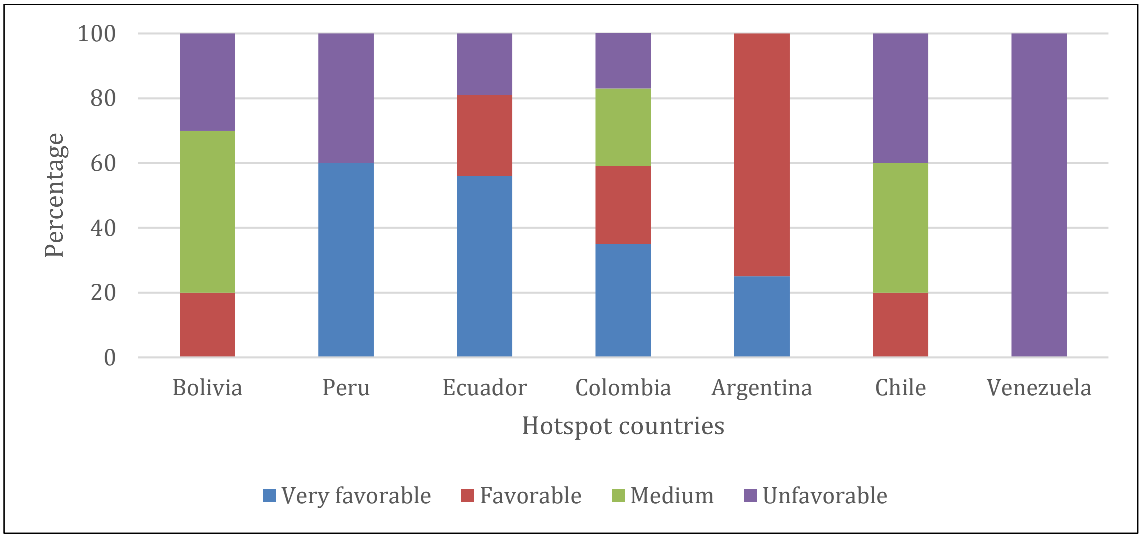
Figure 9.11 CSOs' Strategies to address Conservation Issues in the Hotspot



Source: 2020 consultation process.
Notes: A value of 3 indicates a high preference, while a value of 1 indicates a low preference of the national consultation workshops participants.
The options available for consideration are the following:
Option 1. Dialogue and negotiation of interests with political and economic power actors to find intermediate positions.
Option 2. Resistance and defense of the rights of nature, individuals and indigenous peoples.
Option 3. The construction of alternative development models, based on principles of sustainability, equity and resilience.

With regard to access to funding opportunities, it is important to differentiate three basic aspects: the existence of funding sources, the mechanisms for access, and the 'CSOs' capacities to access funding. The stakeholder consultation shows that, in the last five years, the operating environment for international donor cooperation agencies has been favorable (Figure 9.12), with the exception of Venezuela and Bolivia, despite the fact that Bolivia has registered several international organizations working in the hotspot.

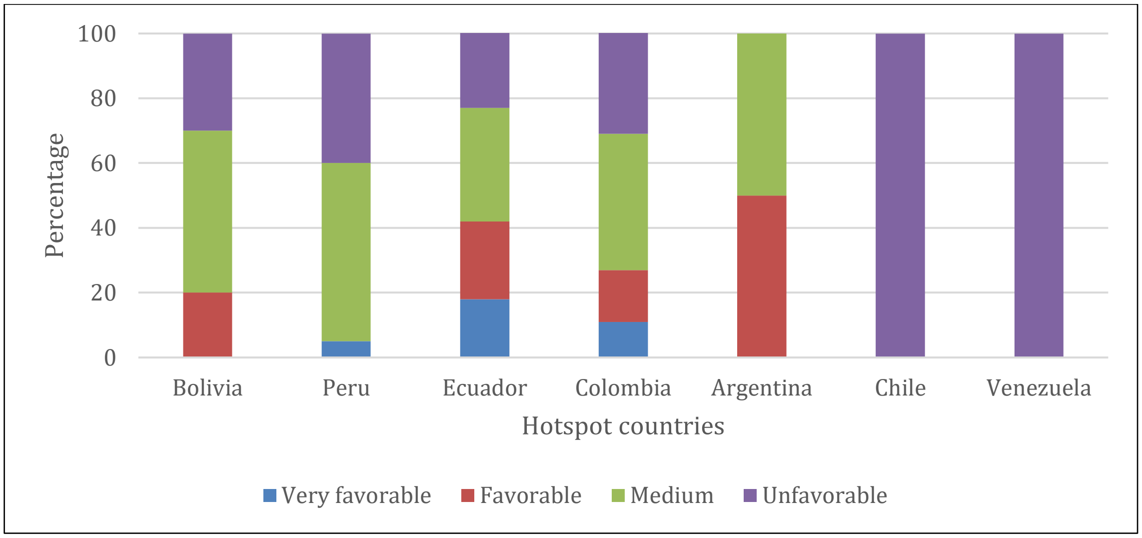
Figure 9.12 Working Environment for International Cooperation Agencies



Source: 2020 consultation process.

On the other hand, the information from participants shows that, despite the existence of funding opportunities, mainly through international cooperation agencies, accessing these resources poses several challenges to national CSOs (Figure 9.13).

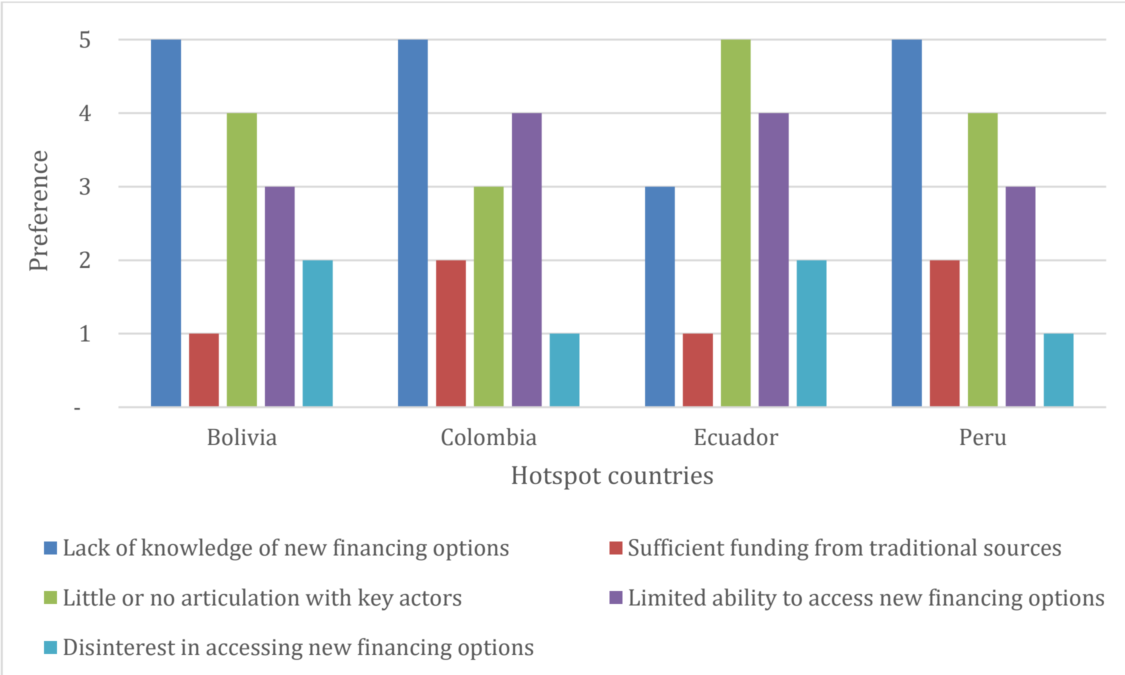
Figure 9.13 Environment for Access to Sources of Financing



Source: 2020 consultation process.

The challenges could be explained in different ways. However, the national consultation workshop participants confirmed that new funding opportunities are linked to emerging topics (e.g. climatic finance, sustainable finances, credits, investments and green financial markets), which CSOs report having poor knowledge about new financial options (Figure 9.14).

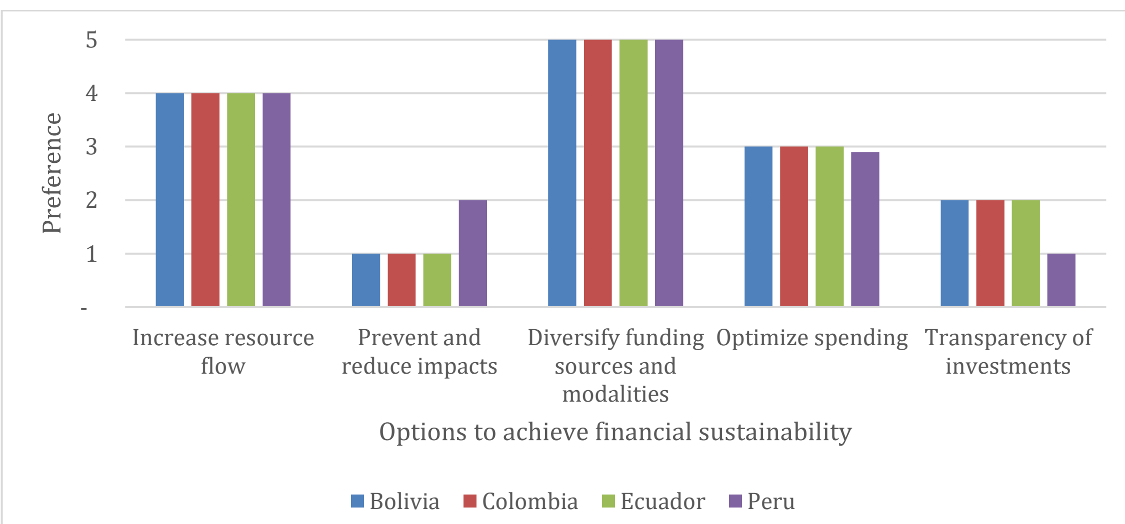
Figure 9.14 Determinants of Access to Emerging Sources of Financing



Source: 2020 consultation process.
Note: A value of 5 indicates a high preference, while a value of 1 indicates a low preference of the people who participated in the national consultation workshops.

CSOs agreed that it is essential to diversify funding sources and modalities and to increase the flow of resources to guarantee the financial sustainability of conservation in the hotspot (Figure 9.15).

Figure 9.15 Strategies to Increase Financial Sustainability of Conservation in the Hotspot

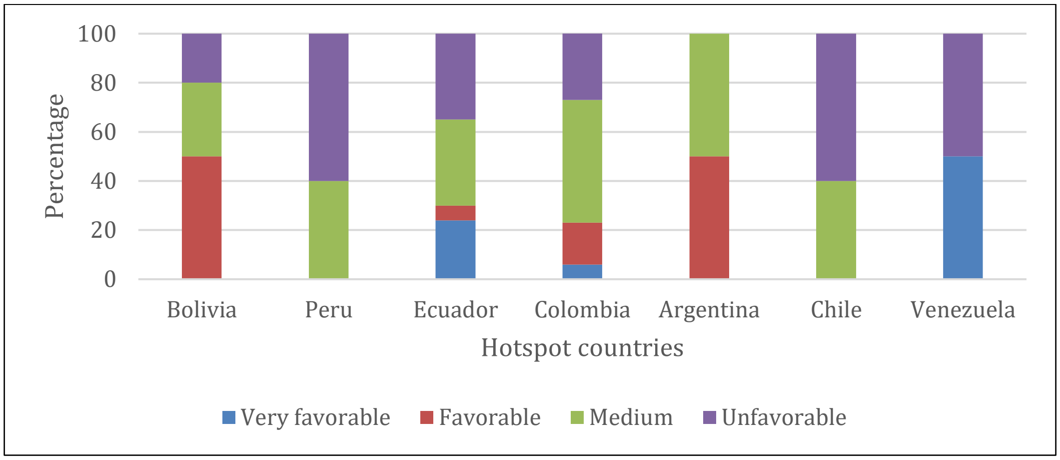


Source: 2020 consultation process.
Note: A value of 5 indicates a high preference, while a value of 1 indicates a low preference of the people who participated in the national consultation workshops.

Finally, it is well-known that conservation CSOs have little knowledge of the opportunities available to generate self-management mechanisms. Although Peru, Chile, Colombia, and Ecuador have developed favorable conditions, regulations, institutions and financing to promote businesses based on biodiversity, forests, and genetic resources, CSOs still need to generate the opportunities and resources necessary for their activities.

Venezuela presents an interesting case: the economic blockade is generating an environment of limited opportunity on the one hand and is encouraging CSOs to develop self-management mechanisms to develop conservation actions (Figure 9.16) on the other hand.

Figure 9.16 Environment of Opportunities for Entrepreneurship and Generation of Self-Management Mechanisms by CSOs



Source: 2020 consultation process.

Stakeholders generally perceive a reduction of funding sources to address conservation priorities in the hotspot. However, this is not corroborated by the evidence of a significant flow of technical and financial cooperation resources that the region is receiving (see Chapter 11). The characteristic trend of the previous period (2010-2015), which was a significant contribution from fiscal sources to cover operational or recurrent expenses of national protected area 'systems', experienced a gradual reduction from 2018 onwards. The situation has now been further exacerbated by the economic crisis generated by the COVID-19 pandemic.

9.4 Civil Society Organizations´ Capacities

The analysis of CSO capacities is based on information obtained from 146 surveys and 268 participants in four national workshops conducted in the process of updating the ecosystem profile. The results presented below are oriented in two directions. Firstly, this section examines the internal operating environment of the organizations, and their administrative, financial, planning and management capacities. Secondly, this section examines their external environment and relationships with other civil society actors and the national government.

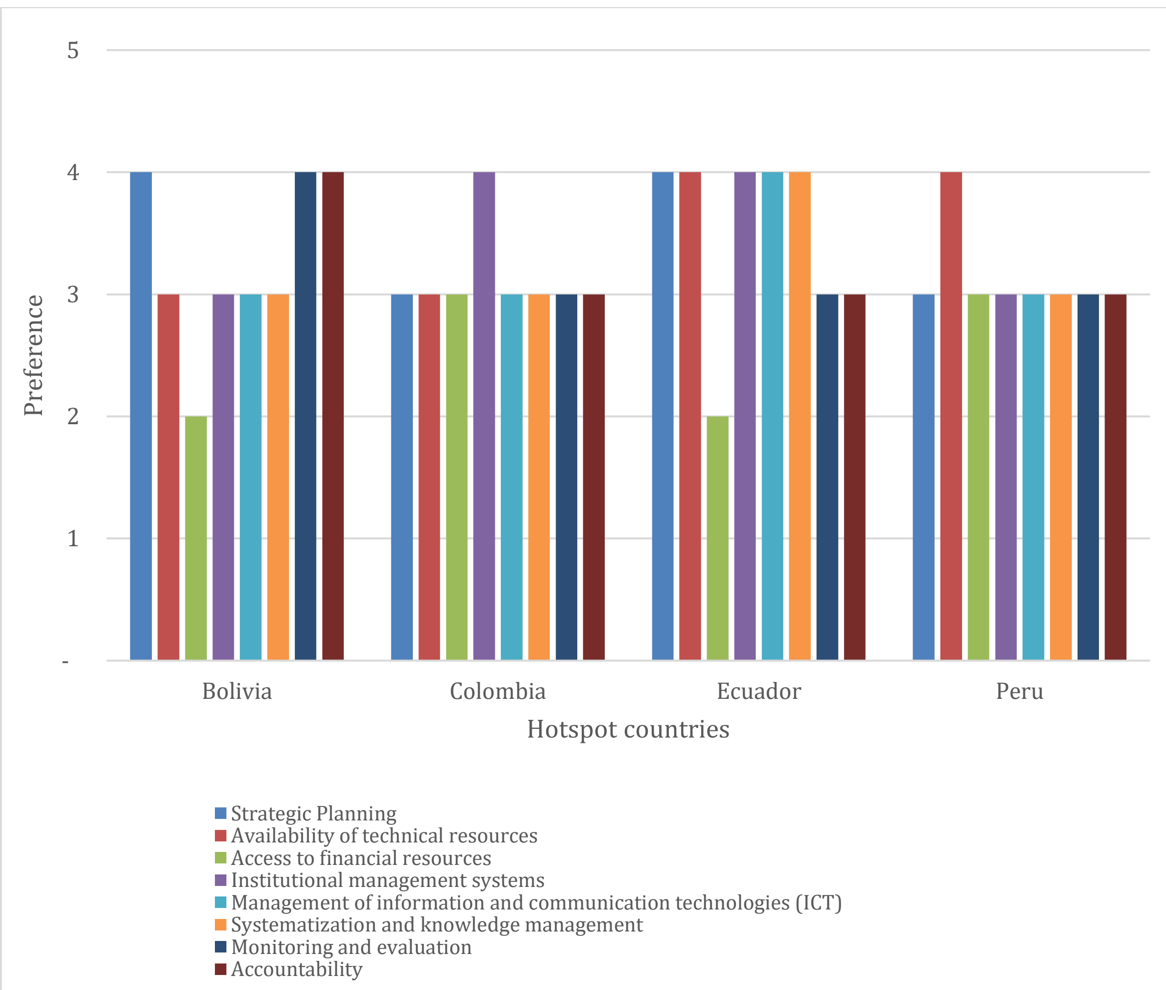
9.4.1 In-house Capacities

The first aspect of capacity relates to the "themes" that CSOs cover. The 2015 observation that "most NGOs focus on traditional conservation activities and less on emerging areas" still holds, although approaches and methodologies related to climate change management, genetic resource prospecting and economic instruments for conservation are beginning to gain space. According to information provided through surveys and national workshops, issues related to the promotion of rights, dialogue and public advocacy, management of socio-environmental conflicts or access to genetic resources are scarcely addressed in the management of CSOs.

On a more administrative level, the CSOs consulted agree that participation in networks, platforms and other coordination structures is a widespread practice that occupies a good part of the management time of their directors and technical staff. On the other hand, aspects related to the preparation of annual work reports and accountability are basically focused on meeting commitments to the donors, cooperation agencies and, to a lesser extent, subnational governments with which collaboration agreements are maintained.

The contribution of CEPF and other cooperation agencies working in the hotspot has undoubtedly helped strength CSO capacities. When asked which of these capacities have been developed with greater emphasis in the last five years, the responses obtained allow for several interpretations (Figure 9.17).

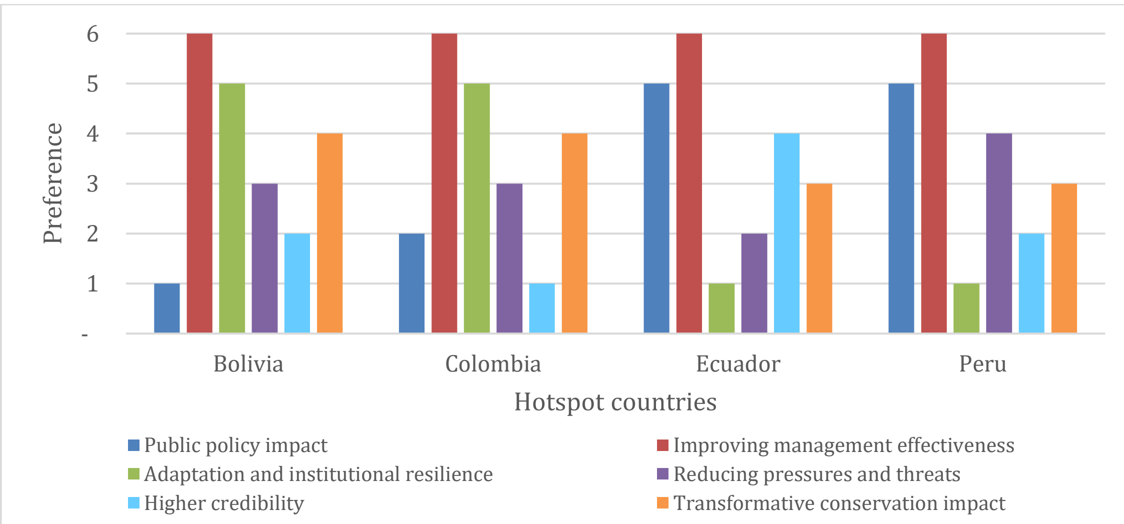
Figure 9.17 Capabilities Developed Internally by CSOs



Source: 2020 consultation process.
Note: A value of 5 indicates a high preference, while a value of 1 indicates a low preference of the people who participated in the national consultation workshops.

When analyzing how these capacities developed by CSOs have made it possible to achieve impact objectives, all the countries agree that the strengthening processes developed in the last five years, in many cases with the support of CEPF, have made it possible to improve the effectiveness of the organizations' management. Ecuador and Peru indicate that this strengthening has contributed to CSOs having more impact on public policies. In Colombia and Bolivia, it has allowed them to develop a greater capacity for adaptation and institutional resilience in the face of the adverse context in which the organizations have had to operate (Figure 9.18).

Figure 9.18 Outcome of CSO Capacity Building



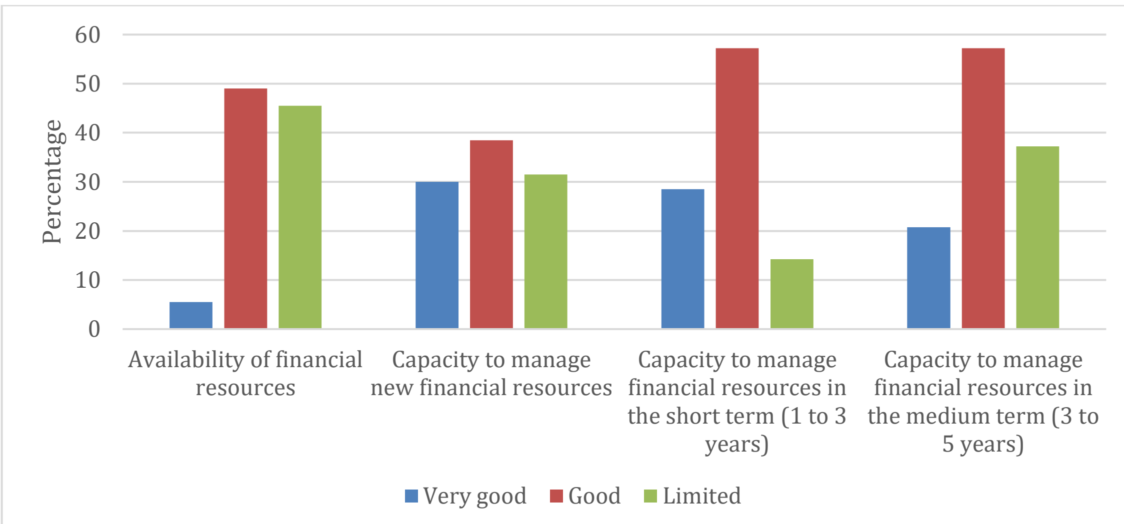
Source: 2020 consultation process.
Note: A value of 6 indicates a high preference, while 1 indicates a low preference of the people who participated in the national consultation workshops.

The strengthening of CSO capacities should be analyzed in detail in order to promote projects that allow for the development of those capacities aimed at achieving long-term sustainability. From a competency development perspective, and based on the responses obtained in the national consultations, it is suggested that emphasis be placed on the following areas: environmental and territorial governance; socio-environmental conflict management; strategic/political communication; public policy management; territorial rights management; dialogue, consultation and advocacy mechanisms; strategic planning; organizational management systems; innovation project design; financial sustainability; development of collaborative platforms and information and communication technologies; management of collaboration and exchange networks; and knowledge and technology transfer.

When asked what support they consider CSOs need to improve their management capacity, the organizations consulted coincided in pointing to the need to strengthen their strategic planning and organizational management systems, with financing as the last option. This signifies a degree of maturity in the organizations, which certainly require greater opportunities to finance their operations but recognize that this is not fundamental to guaranteeing effectiveness and sustainability in the management they carry out in support of biodiversity conservation.

This is corroborated by the fact that 50 percent of those consulted say that they have available financial resources to sustain their operations and also report good capacity to manage these resources in the short term (Figure 9.19). However, long-term financial sustainability is a constant concern since there is great uncertainty about the impact of the economic crisis in the region, which has been aggravated by the COVID-19 pandemic. The stakeholders agree that the economic reactivation process will require an emphasis on the development of self-management strategies based on the use of biodiversity and ecosystem services.

Figure 9.19 Financial Resources Management Capacity of CSOs for Conservation in the Hotspot



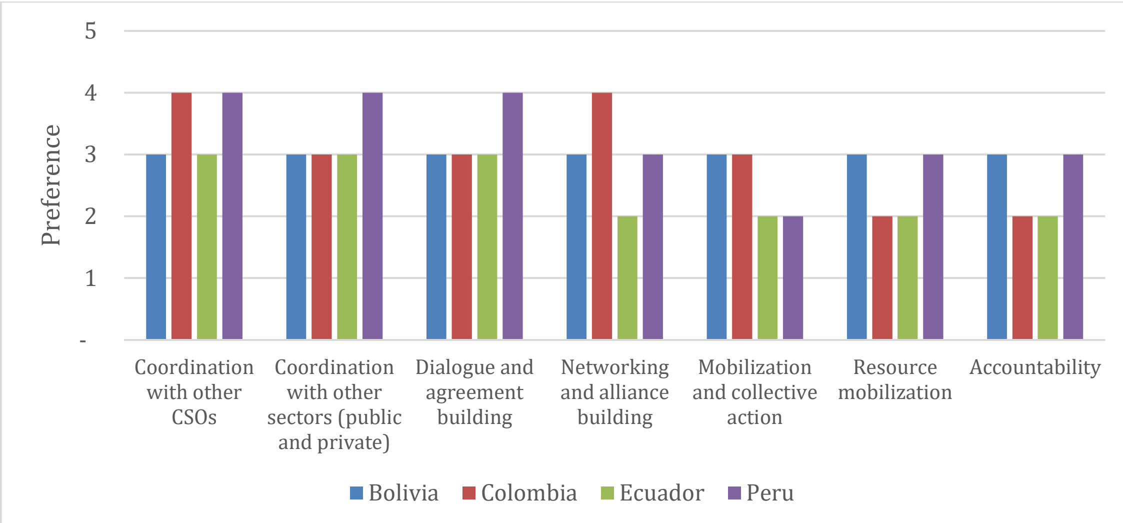
Source: 2020 consultation process.

However, this cannot be generalized to CSOs as a whole. A differentiated look at the situation faced by academic institutions, due to the substantial decrease in public investment in research, development and innovation (R&D&I), reveals a worrying reality that cannot be ignored, especially in view of the need to guide the region's economic reactivation along a path of greater sustainability. The OECD points out that Latin American and Caribbean countries "... invest less in research and development (R&D) than OECD countries. Brazil is the only Latin American country that spends more than 1 percent of GDP on R&D, with approximately half coming from the business sector" (OECD 2020).

9.4.2 External Capacities

On the external front, where relationships are built, interests are negotiated, and collaboration agreements are developed that have an impact on hotspot conservation, it is evident that CSOs still need to improve (Figure 9.20). It is common to coordinate and form alliances between environmental organizations and, to a lesser degree, with public institutions linked to environmental issues. It is less common to find examples of cooperation initiatives with ministries of finance, agriculture, energy, mines, public works, transportation, telecommunications, or with industrial, trade, importers or exporters' associations. Thus, it is necessary to strengthen capacities for the development of cooperation mechanisms between public and private actors in order to move beyond "dialogue among equals" towards the construction of shared agendas.

Figure 9.20 Capabilities Developed in the External Domain of CSOs



Source: 2020 consultation process.
Note: A value of 5 indicates a high preference, while a value of 1 indicates a low preference of the people who participated in the national consultation workshops.

Notwithstanding the above, the CSOs consulted recognize that intra- and intersectoral coordination efforts have been positive, as they have contributed to the design and management of public policies and have increased investments in biodiversity within the hotspot. Peru also highlights that the replication and scaling up of initiatives have been achieved as a result of the capacity building developed over the last five years.

9.4.3 Use of Tools that Contribute to the Internal and External Environment

With regard to the analysis of the gender monitoring tools developed by CEPF for use by its grantees, the level of awareness developed among NGO managerial and technical staff regarding the need to integrate gender aspects into biodiversity planning and management processes in the hotspot is evident. There has also been significant progress in the design of policies, gender-sensitive institutional strategic plans and, mainly, concrete actions at the project level, through which approaches of equality, inclusion and respect for differences are expressed.

The surveys and workshops conducted made it possible to confirm the progress mentioned above: the percentage of women and men on CSO work teams is unbalanced in favor of men, in a ratio of approximately 60:40. The exception is Bolivia, which reports an inverse ratio (around 46 percent are men). Despite these unsurprising figures, all the CSOs surveyed have women representatives in leadership and management positions, a fact that was corroborated in the interviews conducted in addition to this activity.

Based on the stakeholder interviews, the vast majority of CSOs in Peru, Ecuador and Bolivia have an institutional gender policy and an explicit mandate for gender mainstreaming. The profiling team identified only one CSO in Colombia as lacking an institutional gender policy and adopting gender-sensitive practices.

Staff specialized in working with a gender perspective in the CSOs surveyed represent no more than 50 percent on average in all the countries, which is why all the participating organizations provide training to staff in accordance with their needs in this area. Ecuador was the country where this activity was least reported (56 percent), while Peru was the country where it was most developed (80 percent).

Regarding the capacities of civil society organizations, CEPF promotes the use of a tool to measure the progress and improvement of their organizational capacities, through various categories: financial resources, management systems, strategic planning and delivery.
In this regard, during its Phase II, CEPF promoted the use of civil society tracking tools (Civil Society Tracking Tool - CSTT) and gender tracking tools (Gender Tracking Tool - GTT) in its conservation projects (see Chapter 3).

9.4.4 Capacities to Promote Conservation Initiatives

For the evaluation of capacities to promote conservation initiatives, consultations were carried out with NGOs, community and indigenous organizations, universities and producer associations. In each case, human and financial resources and institutional capacities were analyzed.

The results achieved through consultations with 324 key stakeholders (180 surveys, 120 workshop participants and 24 interviews) in the hotspot are presented in Tables 9.8, 9.9, 9.10 and 9.11.

Table 9.8 Institutional Capacity of NGOs consulted in the Hotspot Countries (Total= 50)

Country	Has Sufficient Human Resources			Has Sufficient Financial Resources			Institutional Capacity		
	Yes	Partial	No	Yes	Partial	No	Very Good	Good	Limited
Argentina	>60%	20–60%	<20%		>60%	20–60%	>60%		20–60%
Bolivia	20–60%	>60%	<20%		>60%	20–60%	<20%	>60%	20–60%
Chile	>60%	20–60%	<20%		>60%	20–60%	<20%	>60%	
Colombia	>60%	20–60%	<20%		>60%	20–60%	>60%	20–60%	
Ecuador	>60%	20–60%	<20%		>60%	20–60%	>60%	20–60%	
Peru	>60%	20–60%	<20%		>60%	20–60%	>60%	20–60%	
Venezuela		<20%	>60%			>60%			>60%

Source: 2020 consultation process.

> 60% of people consulted — between 20 and 60% of people consulted — < 20 % of people consulted

Table 9.8 indicates that in most hotspot countries, NGOs have sufficient human resources and, partial, financial resources. In terms of institutional capacities, these tend to be good to very good in most countries.

Table 9.9 Institutional Capacity of Community and Indigenous Organizations consulted in the Hotspot Countries (Total =13)

Country	Has Sufficient Human Resources			Has Sufficient Financial Resources			Institutional Capacity		
	Yes	Partial	No	Yes	Partial	No	Very Good	Good	Limited
Argentina									
Bolivia									
Chile									
Colombia									
Ecuador									
Peru									
Venezuela									
Total									

Source: 2020 consultation process.

> 65% of people consulted — between 25 and 65% of people consulted — < 25 % of people consulted

Table 9.9 indicates that most of the people consulted in indigenous organizations within the hotspot agree that human and financial resources and institutional capacities are only partially available.

Table 9.10 Institutional Capacity of Universities and Research Centers consulted in the Hotspot Countries (Total = 15)

Country	Has Sufficient Human Resources			Has Sufficient Financial Resources			Institutional Capacity		
	Yes	Partial	No	Yes	Partial	No	Very Good	Good	Limited
Argentina									
Bolivia									
Chile									
Colombia									

Ecuador									
Peru									
Venezuela									
Total									

Source: 2020 consultation process.

> 65% of people consulted | between 25 and 65% of people consulted | < 25 % of people consulted

Table 9.10 indicates that, in the academic field, most people consulted maintain there are sufficient human resources, while financial resources are partial and institutional capacities are good.

Table 9.11 Institutional Capacity of Producer Associations and the Private Sector consulted in the Hotspot Countries (Total = 8)

Country	Has Sufficient Human Resources*			Has Sufficient Financial Resources*			Institutional Capacity*		
	Yes	Partial	No	Yes	Partial	No	Very Good	Good	Limited
Argentina									
Bolivia									
Chile									
Colombia									
Ecuador									
Peru									
Venezuela									
Total									

Source: 2020 consultation process.

*Refers to human, financial and institutional resources to develop conservation activities.

> 65% of people consulted | Between 25 and 65% of people consulted | < 25 % of people consulted

Table 9.11 indicates that in the producer associations within the hotspot, most of the people consulted agree that human and financial resources and institutional capacities are only partially available.

9.5 Conclusion

Since 2015, the political, institutional and regulatory context in the countries of the region has made it possible for CSOs to participate in the management of public policies related to biodiversity conservation. Despite strong public investment in conservation in the last five years, very few of these resources have been managed by CSOs (2.1 percent, see Chapter 11). For this reason, financing channeled through international cooperation has been essential to sustaining processes managed by CSOs, mainly in those areas that are part of the countries' commitments to multilateral environmental agreements.

During the last few years, CSOs have strengthened their capacities in technical and operational management. In this regard, conservation at the local scale, at the level of a protected area or KBA, is the area of influence in which most CSOs have focused their efforts and achieved the greatest results. On a broader scale, although there are several projects and initiatives in the hotspot, there is still a need to consolidate networks and citizen collectives to mobilize and position conservation policy proposals on the public agenda. The effort to consolidate long-term processes points to the need to strengthen the capacities of CSOs in the management of digital platforms, both in technological aspects and in the skills needed to make efficient use of them.

Whether at the local, national or regional scale, there is a need for mechanisms to support the financial sustainability of conservation processes. Hotspot countries have made progress in the implementation of innovative financial mechanisms. Now, it is necessary to think of a financial architecture that is attractive to private investment, the financial sector and the contribution of international cooperation agencies.

There is a growing trend of private sector involvement in conservation initiatives and sustainable use of natural resources in the region. This contributes to the fulfillment of profitability and competitiveness indicators, national development plans, the achievement of the 2030 Agenda and the SDGs.

Finally, the uncertainty posed by the COVID-19 pandemic is particularly important to note. Preliminary reports presented by ECLAC, IDB, OECD and the World Bank, show a downward trend in the economies of the region and the poor performance of social, environmental and economic indicators in the coming years. Undoubtedly, the impacts will be reflected at the local, national and regional levels as well as in the public and private sectors.

10. CLIMATE CHANGE ASSESSMENT

Climate change is increasingly affecting different landscapes and processes, not only human populations and their productive activities, but also wild populations, their habitats and natural ecosystems in general. Almost four decades ago, the first warnings were sounded about changes and trends in global average temperature and other climate variables. The Intergovernmental Panel on Climate Change (IPCC) was established in 1988 to provide scientific information to governments for climate policy development. The reports produced by the IPCC are a key input to international climate change negotiations under the United Nations Framework Convention on Climate Change (UNFCCC), the main international treaty on climate change. The IPCC is currently preparing the Sixth Assessment Report, for completion in 2022. This report is a comprehensive assessment of the state of scientific, technical and socio-economic knowledge on climate change, its causes, potential impacts and response strategies.

How does climate change affect the Tropical Andes Hotspot, what are the opportunities for adaptation and mitigation in the hotspot, and what actions are being taken at the level of the countries where the hotspot is present? This chapter attempts to answer these and other questions related to the impact of climate change and how different actors are addressing these concerns across the hotspot.

10.1 Climate History of the Hotspot and its Effects on Biota

The Andes are home to a wide variety of climates that are a product of their topography, their location along the western edge of South America, the influx of southeastern Pacific waters (cold in the south and warm in the north) and the continental trade winds (Martinez et al. 2012; Young 2012). Uplift of the Andes began 200 million to 250 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, the inter-Andean valleys of Ecuador and Peru, the Altiplano of Peru and Bolivia, and the high ridges of Argentina and Chile on the periphery (Mittermeier et al. 2004; Young 2012; CEPF 2015).

Andean climates have changed over geological time due to the uplifting of the Andes, global climate change and the restructuring of water masses caused by the severing of marine connectivity between the Pacific and Atlantic oceans with the establishment of the Isthmus of Panama (Hartley 2003; Garzione et al. 2008; Antonelli et al. 2018). During much of the last 66 million years, the rain shadow of the Andes presumably caused semi-arid conditions in the Central Andes. During the last few million years, global warming and warming of the Humboldt Current led to the strong aridity observed today on the western 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 °C to 9 °C cooler than at present, although precipitation does not appear to have varied sufficiently to cause different forest types from those that occur today (Bush et al. 2004; Tiessen 2012). A series of climatic refugia have formed along the Andes where the local topography has formed distinct dry, humid and super-humid regions, which appear to persist over long time periods (Fjeldså et al. 1999; Killeen et al. 2007). The combination of diverse climates and stable climatic refugia has contributed to the high diversity and endemism now seen in the Tropical Andes (Martínez et al. 2012; Young 2012).

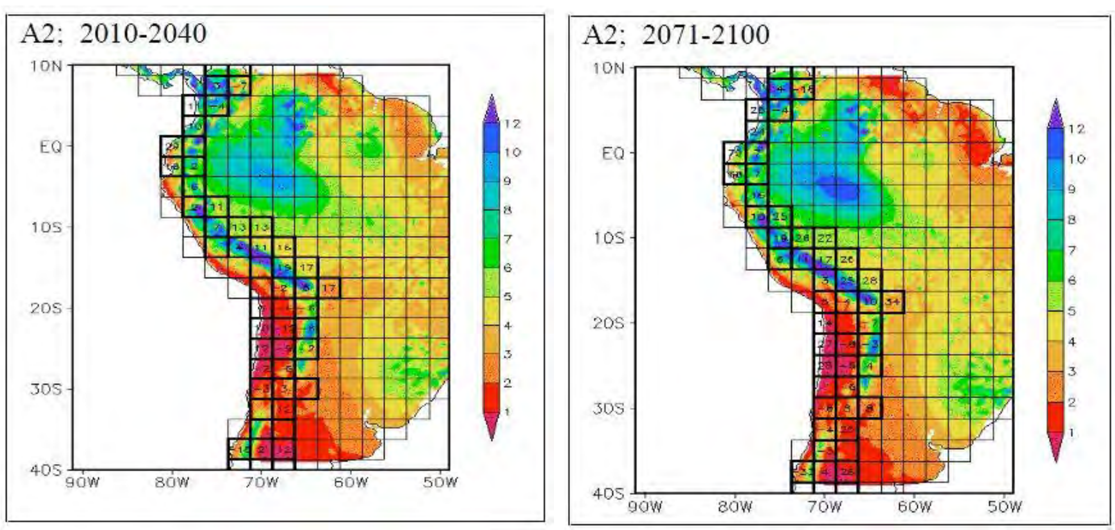
The Tropical Andes is known to contain centers of endemism for several species or species groups, which, due to their limited distribution ranges and specialized requirements are particularly affected by climate change and human disturbance (Noguera-Urbano and Escalante 2015; Tognelli et al. 2018). Centers of endemism for plants and birds, for example, occur in areas that have remained ecologically stable, so historical patterns of climate change have had a major impact on the current distribution of endemics (Killeen et al. 2007; Herzog et al. 2010).

10.2 Projected Impacts of Climate Change on Human Populations and Biodiversity

Land surface temperatures have increased throughout the Tropical Andes region since the 1970s, albeit at a slower rate than the global average (Marengo et al. 2012). Although precipitation has also changed across the Andes, climatologists have so far detected no consistent pattern to the changes. Analyses are complicated by the increasing frequency and intensity of El Niño Southern Oscillation (ENSO) events, which have strongly influenced precipitation patterns since the 1980s (Marengo et al. 2012).

Climate models suggest that future temperature increases in the Andes under greenhouse gas emissions scenarios that match current emissions (for example, the A2 scenario of Meehl et al. 2007) will be in the order of 2 °C to 3 °C by the mid-21st century and 3 °C to 4 °C by the end of the 21st century (Marengo et al. 2012). Most models also project higher temperature increases in the upper altitudes of the Andes (Bradley et al. 2006). The models also predict a 20 to 25 percent increase in precipitation on both slopes of the Tropical Andes (Blázquez et al. 2013; Pabón-Caicedo et al. 2020, Schoolmeester et al. 2016). In contrast, precipitation may decrease by 10 percent in the Altiplano of the southern portion of the Tropical Andes (Neukom et al. 2016) (Figure 10.1, adapted from Marengo et al. 2012). 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 (Foster 2001).

Figure 10.1 Projected Mean Daily Precipitation (mm) for the 21st Century in the Tropical Andes



Source: Adapted from Marengo et al. 2012 by CEPF (2015).

The Tropical Andes Hotspot is home to some of the greatest biological riches on the planet and its mountain ecosystems provide goods and services to both nearby and lowland populations.

However, the hotspot is continuously threatened by unsustainable anthropogenic activities. These are exacerbated by projected changes in climate, as may have happened in the past with Andean megafauna becoming extinct due to the effect of climate on their habitat, in combination with human activities (Rozas-Dávila et al. 2016).

Carbon is constantly flowing into and out of ecosystems. However, as humans destroy large areas of forest at an increasing rate, the carbon cycle is disrupted and the balance is tipped more emphatically towards carbon outflows from ecosystems. By collecting data on carbon in forests, grasslands and wetlands, scientists have determined the amount of carbon stored in ecosystems around the world and measured how long it would take to recover it if it were lost and what this loss would mean for humanity (Goldstein et al. 2020). They have identified "irretrievable carbon" reservoirs, i.e., carbon stocks that are potentially vulnerable to release by human activity and, if lost, could not be restored by 2050 - the year in which the population needs to reach net zero emissions to avoid an unprecedented climate crisis.

The carbon stocks stored in the world's major ecosystems have been analyzed in three facets: (i) whether humans can affect these carbon stocks, (ii) the likely amount of carbon that would be released if ecosystems are destroyed or altered, and (iii) how quickly these carbon stocks could be restored if lost. Against this backdrop, there are certain places on Earth that we simply cannot afford to destroy, i.e., ecosystems that are crucial for prioritizing climate action, and where humans can really have an impact (Goldstein et al. 2020).

Table 10.1 lists the top 10 hotspots on the planet by total mass of irrecoverable carbon. The Tropical Andes Hotspot is the second most important hotspot in the world for irrecoverable carbon.

Table 10.1. Top ten hotspots by total mass of irrecoverable carbon

Position	Hotspot	Tons of irrecoverable carbon
1	Sundaland	681 546 838
2	Tropical Andes	314 291 735
3	Indo – Burma	270 630 066
4	North American Coastal Plain	169 045 350
5	Eastern Afromontane	151 730 888
6	Wallacea	122 334 166
7	Chilean Winter Rainfall and Valdivian Forest	119 342 859
8	Horn of Africa	118 103 598
9	Cerrado	101 453 353
10	Mesoamerica	98 802 274

Source: Moore Center, Conservation International (unpublished data, December 2020).

Ongoing climate change has already left a mark on the natural systems of the Tropical Andes, and scientists have only recently begun to document those changes. Careful observation along an elevational transect of the eastern slope of the Andes in Peru has demonstrated an upslope migration of trees at a rate of 2.5 to 3.5 vertical meters per year due to increasing temperature (Feeley et al. 2011). Timberlines have also migrated upslope in other areas of the Andes, but more slowly (Lutz et al. 2013). Similarly, in Peru three high-elevation frog species have expanded their distribution range vertically within the past century to inhabit newly formed ponds created by ongoing deglaciation generated by global warming (Seimon et al. 2017). Birds have also expanded their distributions to higher elevations in the Tropical Andes (Forero-Medina et al. 2011). However, many species that are capable of shifting their distribution upwards are moving at a much slower rate than is needed to adjust to the current rate of climate change. Although this phenomenon is widespread in the Andes, changes in structure and composition at different elevations are not uniform (Fadrique et al. 2018). Table 10.2 provides an overview of how different species groups differ in their vulnerability to climate change.

Table 10.2. Vulnerability of Tropical Andean Species to Climate Change

Groups	Vulnerability factors
Birds	• High Andean aquatic species such as ducks, grebes, herons, ibises and flamingos may suffer from the effects of drying lagoons and rivers (Herzog et al. 2010; CEPF 2015). • Migratory species (flycatchers, warblers, vireos) are susceptible to disruptions in food availability throughout the migratory cycle (CEPF 2015; Wilsey et al. 2019). • Species that rely on plants that are vulnerable to climate change will suffer from reduced habitat quality (e.g., Polylepis specialists such as the Critically Endangered *Cinclodes aricomae* (CEPF 2015). • It is estimated that 50 percent of Andean species will suffer habitat reduction and 10 percent may disappear by 2050 (Ramírez-Villegas et al. 2014). • Andean upland bird communities face increased threats of extinction due to increases in average temperature, with the limits of their distribution shifting tens of meters up the mountain in the last three decades (Forero-Medina et al. 2011).
Mammals	• Grazing species (guanacos, vicuñas, deer, vizcachas) are susceptible to changes in the species composition of puna grasslands (CEPF 2015; Flores 2016). In addition, vicuñas are considered to be more vulnerable due to the increased incidence of scabies (Pinto et al. 2008). • Increased conflicts with human activities due to the movement of agriculture to high altitude areas - especially for high altitude species, such as the Andean deer, *Hippocamelus antisensis*, and the Andean bear, *Tremarctos ornatus,* that have no options for further ascent, (Lilian Painter, personal communication). • High-elevation rodents may not have higher sites to disperse to (CEPF 2015). • All predictions, including the most conservative scenarios in terms of dispersal and climate change, forsee major shifts in the distribution of mammal species in the Andes (Iturralde-Pólit et al. 2017).
Amphibians	• Many species (e.g., glass frogs, harlequin toads, poison dart frogs) are particularly sensitive to changes in precipitation and humidity (CEPF 2015). • Populations adapted to high-altitude habitats will be affected by the gradual drying of watercourses as glaciers retreat and their supply of water bodies decreases (CEPF 2015; Seimon et al. 2017). • Climate change can increase susceptibility to chytridiomycosis disease (Seimon et al. 2017; CEPF 2015;), as well as population declines and extinctions (Baez et al. 2016).
Reptiles	• Higher temperatures can reduce the number of hours with favorable temperatures for foraging (CEPF 2015). • As temperature in reptiles acts as a controlling factor for physiological processes such as digestion, reproduction (including sex determination

Groups	Vulnerability factors
	during incubation), heart rate, locomotion, among others, climate change may severely affect lizard and snake populations (Urbina-Cardona 2011).
Fishes	• Species adapted to high elevation streams and lakes (such as pupfishes and naked sucker-mouth catfishes) may not tolerate increased water temperatures (CEPF 2015). • Waterbodies with higher temperatures contain less dissolved oxygen, making aquatic habitats less suitable for fish with high dissolved oxygen demand (Maldonado et al. 2012; CEPF 2015). • Range contraction for most fish species, particularly those inhabiting uplands (Herrera-R. et al. 2020).
Beetles	• Loss of habitat and diversity, migration to higher elevations (Larsen 2012; Moret et al. 2016). • Potential invasion of exotic species into current habitat due to climate change (Baez et al. 2016).
Vascular plants	• Species with limited dispersal ability may not be able to track favorable climates fast enough (CEPF 2015; Morueta-Holme et al. 2015). • Páramo species (frailejones, puya, grasses, others) are vulnerable to changes in precipitation and invasive species from lower elevations (CEPF 2015). • Puna grassland species may suffer from increased fire frequency and competition from invading species taking advantage of climatic changes (Lutz et al. 2013; CEPF 2015). • High elevation species may not find higher sites to disperse to (CEPF 2015; Morueta-Holme et al. 2015). • Epiphytic plants (orchids and bromeliads) are vulnerable to decreased cloud-borne mist in montane forests (Ruiz et al. 2008; CEPF 2015). • Pollinator communities may change and reduce plant reproductive output (CEPF 2015; Rojas 2018). • Treeline species such as *Polylepis* may be unable to disperse uphill due to difficulty establishing in non-forest and low humidity communities (CEPF 2015; Morueta-Holme et al. 2015). • Species such as cushion plants, that depend on glacial melt will decline as glaciers disappear (CEPF 2015). • Eighty percent of Andean species will reduce their habitat, while 10 percent will face extinction by 2050 (Tejedor et al. 2015). • Climate change will induce habitat decline for species from colder climates, i.e., those corresponding to high altitude ecosystems (Báez et al. 2016). • Changes in biodiversity patterns and changes in the spatial distribution of high-altitude forests (Báez et al. 2016).

Source: Adapted from CEPF (2015) and others.

Just as species differ in their vulnerability to the effects of climate change, so do Andean ecosystems (Vargas et al. 2017). Based on current knowledge about the key factors responsible for the formation of Andean ecosystems, the history of human intervention and projected climate changes, scientists have estimated the potential vulnerability to climate change of the major ecosystems of the Tropical Andes (Young et al. 2012). Table 10.3 summarizes these analyses. The ecosystems most vulnerable to climate change, páramos and cloud forests, are those that have had the relatively shortest history of human intervention. 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. A bioclimatic modeling exercise confirmed the relative vulnerabilities to climate change of the main ecosystems of the Tropical Andes (Tovar et al. 2013).

Table 10.3. Vulnerability of Major Andean Ecosystems to Climate Change

Ecosystems	Elevational range (m)	Vulnerability	Examples of affected KBAs
Páramo	> 3000	*Highly vulnerable.* Decline in area, encroachment of woody plants, disturbance or degradation due to increased fire regimes. Highly vulnerable due to isolated mountaintop location.	Colombia: Páramos and Bosques Altoandinos de Génova, Parque Natural Regional Páramo del Duende (COL75)
Humid Puna	2000 – 6000	*Moderately vulnerable.* Decrease in area, changes in soil fertility, colonization by invasive species.	Peru: Kosñipata Carabaya (PER44) Bolivia: Cotapata (BOL13)
Puna	2000 – 6000	*Moderately vulnerable.* Increased fire risk, dramatic changes in current vegetation structure and composition.	Bolivia: Parque Nacional Tuni Condoriri (BOL46)
Montane and pre-montane forest	1000 – 3500	*Highly vulnerable.* Decreased occurrence of haze, desiccation, increased incidence of landslides and erosion, forest senescence due to reduced natural regeneration, vulnerability to fire.	Bolivia: Bosque de Polylepis de Madidi (BOL5), Bosque de Polylepis de Taquesi (BOL8) Ecuador: Parque Nacional Podocarpus (ECU50) Peru: Abra Patricia–Alto Mayo (PER7)
Andean seasonal forest	800 – 3100	*Slightly vulnerable.* Less climatic vulnerability than other forest ecosystems, but greater anthropogenic vulnerability due to threat of change of use.	Colombia: Enclave Seco del Río Dagua (COL36)
Andean dry forest	600 - 3600	*Slightly vulnerable.* Invasion of species from wetter areas that could alter species composition.	Peru: Río Utcubamba (PER84)
Wetlands	Throughout	*Highly vulnerable.* Vulnerability to temperature increase, which may alter the hydrological balance. Progressive disappearance due to decreasing deglaciation water.	Colombia: Laguna de la Cocha (COL50)

Source: Young et al. 2012.

The projected impacts of climate change on human populations consider:

Water availability. Higher evaporation rates are expected in lakes and other wetlands due to increased temperature; this would lead to changes in water quality (especially temperature and salinity), with a greater impact in areas where precipitation is projected to decrease. Similarly, accelerated glacier melt will lead to increased surface runoff and reduced water reserves stored in glacier ice (Vuille et al. 2018, Dussaillant et al. 2019). Natural shrub/grasslands could experience water depletion, salinization, reduced area and increased carbon emissions (Noh et al. 2020).

Furthermore, the accelerated retreat of glaciers in the Tropical Andes is one of the most evident consequences of climate change and has a direct effect on the availability of water resources for large cities and small towns in the surrounding areas. This process of glacial retreat threatens future water availability for subsistence economies, agriculture and high Andean populations (Cuesta et al. 2012; Vargas et al. 2017; Tito et al. 2018). Reduced runoff not only threatens water supply for drinking and irrigation, but also for hydropower production, which is critical in the Andes (Bradley et al. 2006). Glacial melt and permafrost are also expected to release heavy metals, especially mercury, affecting water quality for freshwater organisms as well as for domestic and agricultural use (Dupar et al. 2020).

Eventually, the loss of water storage capacity of the higher Andean areas will cause severe imbalances in the lower parts of the basin due to the decreased capacity of the snowpack to store water as ice in the cold season and provide water in liquid form during the warm season (Gonda 2019). In Bolivia, for example, for the metropolitan areas of La Paz and its sister city El Alto, water availability is 80 percent dependent on water from nearby glaciers (Hoffmann et al. 2012). The most notable cases of glacier retreat since the 1980s are the Cordilleras de Apolobamba (40 percent loss of surface area), Tres Cruces (27 percent) and Real (37 percent) (Soruco et al. 2008; Rangecroft et al. 2015).

Glacier retreat in mountain regions has accelerated worldwide in recent decades, prompting efforts to document what will soon become landscapes of the recent past (Ramirez et al. 2020). The evident decline and loss of snow-capped mountains as a consequence of accelerated deglaciation and its repercussions are of growing concern within the global scientific community. This change is considered intimately related to global climate change (Francou 2013). In the Tropical Andes, the rate of glacier retreat since 1950 has exceeded the global average, with a marked increase after 1970. This trend is related to an observed increase in average surface air temperature of 0.1 °C per decade over the last seventy years in the Tropical Andean region (Ramirez et al. 2020).

Climate-induced disasters. Changes in rainfall seasonality, floods, droughts, landslides, hailstorms, cold or heat waves are the most widespread meteorological events. The frequency and intensity of extreme weather and climate events have increased as a result of climate change and will continue to increase under medium and high emissions scenarios (Dupar 2019). In Bolivia, for example, the largest number of adverse events between 2005 and 2009 were floods and droughts (Andrade 2017). The latter led to the declarations of national emergencies in 2016 and 2020. People and infrastructure are increasingly exposed to natural hazards, such as landslides, resulting from changes in frozen lands of high mountain areas (Dupar et al. 2020).

These events cause loss of life and damage to infrastructure and agriculture and are difficult to forecast over any time period (IPCC 2013), posing significant challenges to planners and emergency response and disaster risk management agencies (CEPF 2015).

Degradation of natural habitats. Rising temperatures can increase the frequency of fires, which reduce the quality of existing agricultural lands and affect natural ecosystems (Vargas et al. 2017). The cycle can modify local weather conditions by increasing warming and reducing precipitation, thereby exacerbating the problem and causing more pressure on natural systems. Biomass burning also lowers air quality causing concern for human health. Furthermore, the risks generated by degraded ecosystems alter their natural functioning and reduce their capacity to maintain the ecosystem service of protection against natural hazards such as floods and landslides (Pacha 2020).

Disease outbreaks. Climatic conditions have a major influence on diseases transmitted by waterborne pathogens or insect vectors. Changes in climate are likely to lengthen the seasons of vector-borne disease transmission and alter their geographical distribution (Rodríguez-Pacheco et al. 2019).

Diseases such as dengue, zika and chikungunya, as well as malaria and yellow fever are tending to increase in incidence in the countries of the region. The increase in global average temperature would extend the breeding range of the *Aedes aegypti* mosquito and thus increase the likelihood of more people contracting these diseases (see, e.g., Márquez et al. 2019).

It is worth noting that in November 2020, Bolivia, Chile, Colombia, Ecuador, Peru and Venezuela presented the "Andean Health and Climate Change Plan 2020 - 2025", which sets out the actions needed to increase the resilience of the Andean countries to climate variability and change, protect the health of their populations and lead the region towards a sustainable future (ORAS-CONHU 2020). This plan aims to be a key instrument to contribute to the reduction of the negative effects of climate change on health, based on strategies for adequate integrated management, increased resilience, stronger cooperation networks and progressive integration among the Andean countries.

Effects on agriculture. Climate change has already been implicated in the spread of fungal diseases in maize, potato, wheat and bean crops in Peru (Torres et al. 2001), and will almost certainly affect more crops in the future. Similarly, it is exacerbating human-wildlife conflicts, as wild animals tend to increase their impact not only on crops, but also on pastures and domestic livestock (Rojas-Vera et al. 2019; Vargas et al. 2020).

Uncertainty about the impact of temperature rise, CO_2 increase, precipitation trends and emission scenarios on agricultural crop productivity and disease vulnerability has led to great concern over the future food supply for growing populations across Latin America (Tito et al. 2018).

In summary, the rise in the Earth's temperature affects desertification processes (water scarcity), land degradation (soil erosion, vegetation loss, forest fires, snowmelt) and food security (instabilities in crop yields and food supply). These changes put food systems, livelihoods, human and ecosystem health at risk (Dupar 2019).

10.3 Resilience to Climate Change

One way to understand how vulnerable a hotspot is to climate change is to assess the resilience of the corridors that contribute to ensuring landscape connectivity, the connectivity of KBAs and provision of ecosystem services.

Based on the conservation corridors identified for the Tropical Andes, bioclimatic modeling has been carried out to understand how vulnerable the hotspot is to climate change. Corridors that currently encompass a broad diversity of climatic regimes provide more opportunities at the regional scale for species to track suitable climates as they move across the landscape. Such corridors are, therefore, more resilient than corridors with less diverse climates.

Spatial analyses scored each corridor for bioclimate diversity, based on the classifications defined and mapped at the global level by Metzger et al. (2013). The climate model of Metzger et al. (2013) describes the main temperature and precipitation gradients. The various combinations of these parameters provide an indication of regional bioclimatic diversity. The results have been marked textually as High, Medium high, Medium low and Low, for better interpretation of the results (Table 10.4); thus, corridors that have been assigned High bioclimatic diversity are considered to be more resilient to climate change.

Table 10.4. Bioclimatic Diversity of Corridors in the Tropical Andes Hotspot

Corridor name	Country	Bioclimatic diversity (Metzger et al. 2013)
Cordillera Oriental – Bogotá	Colombia	Medium low
Carpish – Yanachaga	Peru	Medium high
Chilean / Bolivian Altiplano Saline Lakes	Bolivia / Chile	Low
Cóndor – Kutukú – Palanda	Ecuador / Peru	Medium low
Cordillera de la Costa Central	Venezuela	Medium high
Cordillera de Vilcanota	Peru	High
Cotopaxi – Amaluza	Ecuador	Medium high
Isiboro – Amboró	Bolivia	High
Tierras altas de Lima – Junín	Peru	Low
Madidi – Pilón Lajas – Cotapata	Bolivia / Peru	High
North of the Cordillera Oriental	Colombia	High
Central Cordillera	Colombia	Medium Low
Noreste de Perú	Peru	High
Paraguas–Munchique – Bosques Montanos del Sur de Antioquia	Colombia	Medium high
Cordillera de Perijá	Venezuela	High
Sierra Nevada de Santa Marta and surrounding areas	Colombia	High
Sonsón – Nechi	Colombia	Medium low
Tarija – Jujuy	Argentina / Bolivia	Medium high
Trinational Puna	Chile / Argentina / Bolivia	Low
Tucumán Yungas	Argentina	Medium high
Dry Forests of Tumbes – Loja	Ecuador / Peru	Medium low
Venezuelan Andes	Venezuela	High
West Azuay	Ecuador	Medium low
Northeast of Quindío	Colombia	Medium low
Awá – Cotacachi – Cotopaxi	Ecuador / Colombia	Medium low
Nororiental	Ecuador	Medium high
Sangay	Ecuador	Medium high
La Victoria – La Cocha – Sibundoy	Colombia	Medium high

The analysis revealed that most corridors in the hotspot currently have High to Medium High bioclimate diversity (Table 10.4, Figure 10.2). By this measure, the hotspot corridors should be fairly resilient to climate change. It should be noted, however, that seven corridors: Cordillera Oriental - Bogota, Cordillera Central, Sonsón - Nechi and Northeast Quindío (in Colombia), West Azuay (in Ecuador), Condor - Kutukú - Palanda and Dry Forests of Tumbes – Loja (shared by Ecuador and Peru) and Awá - Cotacachi - Cotopaxi (shared by Ecuador and Colombia), have Medium low bioclimatic diversity.

In general, however, it is assumed that natural habitats in different bioclimates retain connectivity that allows plants and animals to disperse as they go in search of favorable climates (CEPF 2015). The high overall bioclimatic diversity is not surprising given the steep elevation gradients that characterize the Tropical Andes and drive climatic variability (Young 2012). The corridors with the lowest climatic diversity are found on the Pacific slope of the Andes near Lima, Peru, and in the extreme southwest of the hotspot in the border area between Bolivia, Chile and Argentina. Both regions are characterized by dry climates and less topographic diversity than elsewhere in the hotspot (Josse et al. 2012; Young 2012).

10.4 Potential Impacts of Human Response to Climate Change on Protected Areas, Natural Areas and Biodiversity

Climate change is causing many high Andean biomes to retreat to higher altitudes and undergo changes in their composition. The most affected are those in glaciated areas, páramos and mountain forests, which play a key role in the provision of ecosystem goods and services: climate regulation, water supply, reduction of greenhouse gas (GHG) emissions.

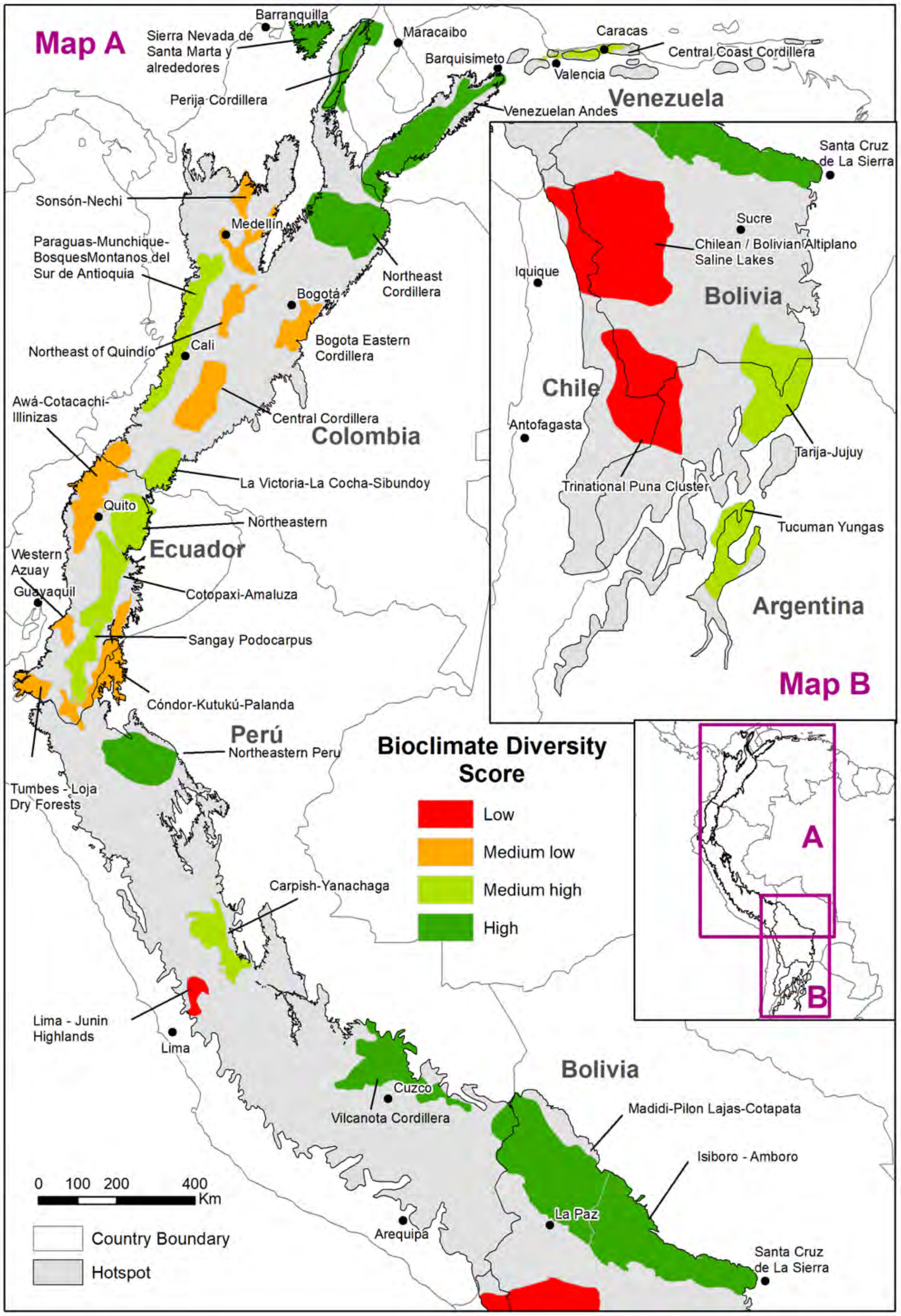
Likewise, the displacement of species to higher altitudes can increase the risks of the spread of invasive species and diseases. In addition, land-use change, such as the conversion of ecosystems for agricultural or livestock use, exerts a double pressure on Andean ecosystems.

Warming in low-lying areas generates an increase in rural migration due to the need for farmers to find higher ground in order to maintain productivity of traditional agriculture practices (without climate change adaptation technologies). This is being documented for crops such as coffee and cocoa, on which a large proportion of the population in the Tropical Andes depends. For example, a recent assessment of the impact of climate change on the Peruvian coffee sector concluded that only 23 to 36 percent of current coffee-growing areas in the north-eastern region, where more than 50 percent of the country's coffee is grown, will maintain stable conditions for coffee production. Unfortunately, 40 percent of current coffee growing areas will lose suitability for this crop. The same study also found that more than 440,000 hectares at higher altitudes may have agro-climatic suitability for coffee cultivation, but these lands are mostly located in protected areas and indigenous territories (Robiglio et al. 2017).

Pressure for land will increase hunting, harvesting and extraction in remaining forests and increase the burden on natural pasture areas so that wildlife will be marginalized to less productive lands to maintain viable populations.

As discussed above, climate change will require adequate planning to maintain the provision of ecosystem services to the most populated areas, especially the provision of water to large urban centers within the hotspot.

Figure 10.2. Bioclimatic Diversity of Tropical Andes Hotspot Corridors



10.5 Opportunities for Climate Change Adaptation and Mitigation in the Hotspot

Broadly speaking, Andean land-use planning must consider compatible use under a climate change scenario and reconcile land uses in a way that maintains a balance between the expansion of agriculture, conservation areas and other land uses, such as forest management, agroforestry, silvopasture and others that provide ecosystem services. These uses, although having different objectives, are so closely related to each other that biological diversity flows between protected areas and the other areas (Sayer et al. 2013).

In this regard, for example, maintaining the productive capacity of land currently in use contributes to the permanent establishment of rural populations. This prevents expansion into more biologically sensitive areas and promotes more intensive land-use systems, while other land uses such as protected areas or forest production areas play a buffering and connectivity role.

Maintaining the health of terrestrial and aquatic ecosystems is crucial for mitigating climate change, as they act as major sinks for greenhouse gases, absorbing almost 50 percent of global emissions (Friedlingstein et al. 2019). Otherwise, degradation of these ecosystems can transform them into sources of GHG emissions, further exacerbating climate change impacts (Shukla et al. 2020). This is particularly relevant for páramos, Andean forests and wetlands, which represent the largest carbon stocks in the Tropical Andes (Gonda 2020).

The conservation of forests as carbon sinks and for the regulating and provisioning ecosystem services they provide is particularly relevant as deforestation and forest degradation constitute two of the main sources of greenhouse gas emissions in the hotspot. Reducing emissions from deforestation and forest degradation (REDD) is a strategy for mitigation, biodiversity conservation, forest management, wetland conservation and restoration, and grassland conservation (Moreno et. al. 2016).

Adaptation is not only about conservation and sustainable use of biodiversity. It is also about increasing resilience to climate change through protected area systems, adaptive management (efficient water use, climate-resilient crops), diversified agroforestry systems and ecosystem restoration. Adaptation actions represent an opportunity for the population to adapt to the effects of climate change.

Consolidating protected area systems involves creating new protected areas where this is a priority and strengthening the management of these areas and their areas of influence. It also consists of complementing them with other effective area-based conservation measures, such as indigenous reserves, territorial reserves (for indigenous peoples in isolation and initial contact), conservation corridors, or conservation concessions.

In addition to adaptation and mitigation actions to reduce the vulnerability of these ecosystems, it is necessary to promote the development of public policies aimed at comprehensive landscape management at the various levels of government (national and sub-national). It is also necessary to strengthen environmental governance under the various conservation regimes (protected areas, indigenous reserves, private conservation). This would include, for example, strengthening the governance of indigenous territories, which occupy at least 21 percent of the hotspot area (Andrade-Pérez et al. 2011).

Climate change is changing traditional practices, which implies shifting policy priorities or allocating resources to underfunded actions. To this end, it is appropriate to update information on the KBAs in the Tropical Andes Hotspot that are most threatened, taking into account the impacts of climate change and land-use change.

Climate impacts on the hotspot have been little studied. It is appropriate, therefore, to fund and promote research to address the main knowledge gaps and disseminate the findings.

10.6 Policy Responses and Initiatives on Climate Change

All hotspot countries have joined the UNFCCC, with the aim of stabilizing greenhouse gas concentrations at a level that prevents dangerous anthropogenic interference with the climate system.

Various mechanisms and strategies have been implemented in the region to conserve ecosystems and their services, cope with climate change and improve people's livelihoods. These include policies, programs and projects linked to: Reducing Emissions from Deforestation and Forest Degradation (REDD+) and Nationally Determined Contributions (NDCs) (Aguilar et al. 2019; Samaniego et al. 2019).

Since 2005 and during the last decade, REDD has been part of the UNFCCC negotiations because of its ability to maintain and enhance forest carbon sinks, which contributes positively to global greenhouse gas emission reduction targets. It also has additional benefits related to biodiversity enhancement, maintenance of water resources and food security.

Land use, land-use change and forestry (LULUCF) are important sources of emissions for most tropical countries, despite the relatively small contribution of hotspot countries to global GHG emissions. The IPCC identifies REDD+ as the activity with the greatest potential to mitigate these sources of GHG emissions (Table 10.5).

In the presentation of total CO_2 emissions by country in Table 10.5, Argentina and Colombia stand out. Peru and Colombia stand out in the presentation of emissions from the LULUCF sector.

Table 10.5. Contribution of Tropical Andes Hotspot Countries to Global Emissions, and Land Use, Land-Use Change and Forestry (LULUCF)

Country	Total emissions in megatonnes CO_2 equivalent	LULUCF emissions in megatonnes CO_2 equivalent	GHG emissions in the Tropical Andes
Venezuela	243,380 (Bolivarian Republic of Venezuela 2017b)	6,395 (Bolivarian Republic of Venezuela 2017b)	Potentially high, especially in the high Andean zone (Bolivarian Republic of Venezuela 2017b).

Country	Total emissions in megatonnes CO_2 equivalent	LULUCF emissions in megatonnes CO_2 equivalent	GHG emissions in the Tropical Andes
Colombia	258,800 (IDEAM et al. 2016)	67,288 total (IDEAM et al. 2016)	Due to the limited extent of Andean forest, emissions are potentially low but severely affect water provision services in densely inhabited areas (Etter et al. 2000). GHG emission reduction commitment 51 percent by 2030 (Republic of Colombia 2020)
Ecuador	80,627 (Republic of Ecuador 2019)	20,439 (Republic of Ecuador 2019)	The extent of Andean forests is less than tropical rainforest, but important for the provision of water to cities (Republic of Ecuador 2017).
Peru	147,095 (Republic of Peru 2020a)	86,472 (Republic of Peru 2020a)	Potentially high if soil carbon pools in high altitude peatlands are degraded (Miyamoto et al. 2018). Commits to a 40 percent reduction in projected GHG emissions by 2030 (Republic of Peru 2020a).
Bolivia	80,627 (Plurinational State of Bolivia 2015)	38,701 (Plurinational State of Bolivia 2015)	Potentially high, loss of Andean forests will lead to severe water imbalances and biodiversity disruption (Plurinational State of Bolivia 2015)
Chile	97,000 (Aguilar et al. 2019)	No data	Has committed to reduce its CO2 emissions per unit of GDP by 36 percent from the 2005 level by 2030 (Republic of Chile 2020)
Argentina	364,000 (Republic of Argentina 2020)	No data	It has committed not to exceed the net emission of 359 million tons of carbon dioxide equivalent (MtCO2eq) by 2030 at the country level (announcement by the President of Argentina, Alberto Fernandez, during his participation in the Climate Ambition Summit, December 2020).

REDD and REDD+ strategies (whose implementation includes conservation components, sustainable forest management with the participation of local people and the enhancement of forest carbon stocks) are relevant for the conservation of ecosystem services and contribute to the development of the communities that depend on them (Angelsen et al. 2019). This is why they are incorporated by the countries of the region in various instruments and levels of participation, as shown in Table 10.6.

Table 10.6. Countries in the Tropical Andes Participating in REDD+

Country	Characteristics
Venezuela	It has no registered carbon projects. It does not participate in the UN-REDD program (UNEP 2016b).
Colombia	Has a national strategy to reduce emissions from deforestation and forest degradation, REDD (Republic of Colombia 2016a).
Ecuador	Actively participates in the REDD initiative and has a results-based payment scheme (Republic of Ecuador 2016)
Peru	Actively participates with support from UN-REDD office and has a national forest and climate change strategy (Peña 2014; Republic of Peru 2020a)
Bolivia	Participates with initiatives registered with the national authority, the Ministry of Environment and Water (UNEP 2016a)
Chile	Participant of the Initiative and has a national strategy for REDD implementation (Republic of Chile 2015 and 2020)
Argentina	Participant of the Initiative and has a national REDD implementation plan (Republic of Argentina 2017 and 2019)

Overall, REDD+ has been perceived by most hotspot countries as a promising opportunity to mobilize additional financial resources for forest conservation and management under a global mechanism for reducing GHG emissions (CEPF 2015). Reducing deforestation and degradation is seen as having important benefits for biodiversity and forest conservation, and additional international funding is widely seen as a contribution to scaling up national sustainable development goals. It should be noted, however, that the Government of Bolivia has been particularly critical of REDD+ in UNFCCC negotiations and other global forums, advocating instead for a Joint Mitigation and Adaptation Mechanism. It has also expressed a preference for the use of public funds, as opposed to market-based regulatory mechanisms, for implementation (Angelsen et al. 2010; Estado Plurinacional de Bolivia 2012). Argentina, Chile and Venezuela have significant reforestation programs that create a distinctive profile at the national level resulting in the Land Use, Land Use Change and Forestry (LULUCF) sector being a net sink, with reforestation activities largely concentrated 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 to address continued significant deforestation pressures (CEPF 2015; Orduz 2015).

In 2015, the historic Paris Agreement to combat climate change was signed by UNFCCC member countries. This agreement entered into force in 2016 and aims to prevent the increase in the global average temperature of the planet from exceeding 2 °C above pre-industrial levels, and also seeks to promote additional efforts to ensure that global warming does not exceed 1.5 °C.

As part of the Paris Agreement, countries undertook to define their efforts to reduce emissions (mitigation) and adapt to the effects of climate change, which are set out in their respective Nationally Determined Contributions (NDCs). The formulation and implementation of the NDCs has required leadership at the highest political level to facilitate sectorial and territorial articulation, as well as the development of spaces for the participation of various stakeholders (private sector, academia, indigenous peoples, civil society, etc.). Likewise, it has been fundamental for the hotspot countries to have a framework of policies or regulations related to climate change management.

As countries work to comply with NDCs under the Paris Agreement, they can use REDD+ as it offers emission reductions while protecting their forests (Bistend et al. 2019). The Paris Agreement also recognizes that some countries are interested in transferring and trading carbon credits to meet NDCs.

The most salient policies and/or rules related to climate commitments and REDD+ by country are described in Table 10.7.

Table 10.7. Climate and REDD+ policies in Tropical Andes Hotspot countries

Country	NDC and REDD+	REDD+ Policies
Venezuela	Following the Paris Agreement, which Venezuela recognized as Law of the Republic, it signed the agreement at the United Nations in 2016 and ratified it in 2017. The approval of its NDCs occurred in 2017 without specific mention of REDD+ (Bolivarian Republic of Venezuela 2017a and 2017b). The mitigation target considers an emissions reduction of 20 percent by 2030, relative to an inertial scenario (if the mitigation plan is not implemented). Although it does not yet have a Climate Change Mitigation and Adaptation Plan, for adaptation it has prioritized measures in the sectors of electricity, industry, housing, transport, health, biodiversity, food sovereignty and agriculture, water and forest conservation and management, research, education and culture, waste management, land management, risk management, emergencies and disasters (Bolivarian Republic of Venezuela 2017a and 2017b; Villamizar et al. 2018).	Despite initial tacit support, there is no mention of these policies in official documents.
Colombia	It submitted its NDCs in 2015 (Republic of Colombia 2016a) and they were approved in 2018. It has prepared its 2020 update in consultation with civil society where it presents REDD+ as a cross-sectorial mechanism (Republic of Colombia 2020). It set a mitigation or emissions reduction target of 51 percent by 2030 compared to the projected baseline (if no action were taken), prioritizing the sectors of transport, energy, agriculture, housing, health, trade, tourism, industry and protected areas (Republic of Colombia 2020).	Colombia has developed several policy instruments to address climate change, such as the Colombian Low Carbon Development Strategy (ECDBC by its acronym in Spanish) in 2012, the National Strategy for Reducing Emissions from Deforestation and Forest Degradation (ENREDD+ by its acronym in Spanish) in 2018 and the National Climate Change Adaptation Plan in 2016 (Republic of Colombia 2020).
Ecuador	It published the first version of its NDCs in 2019 (defined through a participatory process during 2018), where it mentions REDD+ as a mechanism to be applied (Republic of Ecuador 2019). The mitigation target is a 9 percent emission reduction by 2025 (base year 2015) and comprises the aggregate contributions of the energy,	The Ministry of Environment has issued a series of agreements that provide a framework for action to implement the REDD+ approach (Republic of Ecuador 2019).

Country	NDC and REDD+	REDD+ Policies
	agriculture, industrial processes and waste sectors. For the LULUCF sector the mitigation target is 4 percent compared to 2015. The priority themes for adaptation are human settlements, water resources, productive and strategic sectors, health and food sovereignty, agriculture, livestock, aquaculture and fisheries, with a focus on risk management (Republic of Ecuador 2019).	
Peru	In 2015, Peru submitted its NDCs to the UNFCCC, based on REDD+ as a mechanism to achieve this (Republic of Peru 2016). It has recently committed to a 40 percent reduction in projected GHG emissions by 2030 (Republic of Peru 2020a). Adaptation targets are defined according to the prioritized sectors of water, agriculture, fisheries, forests and health (Republic of Peru 2020a). The creation of a multi-sectorial working group for NDC planning is noteworthy. Similarly, spaces for dialogue have been established with the private sector, civil society and the general public for the planning and management of NDCs. In September 2020, a High Level Commission on Climate Change (CANCC by its acronym in Spanish) was officially installed, which will be in charge of proposing climate change adaptation and mitigation measures expressed in the NDCs, as well as updating the National Climate Change Strategy to 2050, in order to promote Peru's transition to a low-carbon and climate-resilient development (Republic of Peru 2020b). Similarly, in October 2020, the Platform of Indigenous Peoples to Confront Climate Change was officially created, made up of seven indigenous organizations and two ministries.	Despite the existence of ongoing projects, REDD+ indicators have not yet been established in the budget management instruments of the Ministry of Environment, MINAM for its acronym in Spanish (Republic of Peru 2019). In August 2019, MINAM launched the project "Guidelines for the identification and classification of REDD+ Actions", which will serve to provide clarity on the activities that can be considered REDD+ and thus be able to: i) Include them in the National Registry of Mitigation Measures-RENAMI, by its acronym in Spanish; ii) Access Payment for Results; and iii) Access carbon markets. (Republic of Peru 2020b)
Bolivia	It submitted its NDCs to the UNFCCC in 2015 and a review and update was planned for the end of 2020 (Plurinational State of Bolivia 2015; Retamal and Gutiérrez 2020). With a focus on adaptation, mitigation and risk management, aligned with its Living Well Policy (Plurinational State of Bolivia 2015), with targets to 2030 and prioritizing the thematic areas of water, energy and forest-agriculture. No emission reduction targets were set, but sectorial targets were set to triple water storage capacity by 2030, increase the share of renewable energy to 79 percent by 2030, and increase the area of forests under integrated and sustainable management, with a community approach, to 16.9 million hectares by 2030 (Plurinational State of Bolivia 2015).	It has started the implementation of pilot initiatives of the joint mitigation and adaptation mechanism for the integrated and sustainable management of forests, an alternative approach to REDD+. The Bolivian government has been very critical of REDD+ in the UNFCCC negotiations, taking a position against the commodification of nature and in favor of climate justice (Angelsen et al. 2019).
Chile	It submitted its NDCs to the UNFCCC in 2015 and presented an update in 2020 with a commitment to reduce its CO_2 emissions per unit of GDP by 36 percent by 2030 (Republic of Chile 2020). This target corresponds to an intermediate point on the road to carbon neutrality by 2050.	The forestry sector has implemented the REDD+ initiative for the conservation of native forests through the National Forestry Corporation (CONAF by its acronym in

Country	NDC and REDD+	REDD+ Policies
	Specifically, for the Land Use, Land Use Change and Forestry (LULUCF) sector, the recovery of 200 000 ha of native forests and the afforestation of 200 000 ha with native species has been proposed. For adaptation, actions have been proposed within the framework of the National Adaptation Plan and sectorial plans (Republic of Chile 2015 and 2020).	Spanish), which contributes to Chile's voluntary commitment to the UNFCCC to reduce its GHG emissions by 36 percent (Republic of Chile 2015 and 2020).
Argentina	Argentina submitted its NDC in 2015 (Republic of Argentina 2020). This version was updated and after a revision process it submitted its NDCs to the convention in 2016 (Republic of Argentina 2016). It has adaptation measures focused on the sectors of forests, water, crop management and biodiversity conservation strongly linked to the same objective (Republic of Argentina 2019). Regarding its mitigation commitments, it proposed not to exceed net emissions of 359 million tons of carbon equivalent by 2030, in the energy, agriculture, forestry, transport, industry and waste sectors. Adaptation measures are focused on the sectors of forests, water, crop management, health, biodiversity conservation and extreme events.	In its National Action Plan on Forests and Climate Change it mentions the role of REDD+, but without mentioning implementation mechanisms (Republic of Argentina 2017).

REDD+ project-level activity is oriented towards the voluntary carbon market, which has been developed in some hotspot countries, mainly in Colombia and Peru. Carbon markets make it possible to neutralize or offset emissions through carbon credits generated by projects that reduce emissions elsewhere. Of course, it is essential to verify or validate the emission reductions generated by projects. In the hotspot, there are 15 projects validated under the Verified Carbon Standard (VCS) or the Climate, Community and Biodiversity (CCB) Standard, as shown in Table 10.8.

Table 10.8. National REDD+ Projects Validated or Verified under the Verified Carbon Standard (VCS) or the Climate, Community and Biodiversity Standard (CCB), Tropical Andes Hotspot

Country	Project	Proposer	Standard	Location
Peru	Alto Mayo Conservation Initiative	Conservation International (CI)	VCS, CCB – Gold[1]	San Martin Region
Peru	REDD+ Project at the Concesión de Conservación Alto Huayabamba (CCAH)	Amazónicos por la Amazonía (AMPA)	VCS, CCB – Gold[2]	San Martin Region
Peru	Cordillera Azul National Park REDD+ Project	Centro de Conservación, Investigación y Manejo de Áreas Naturales (CIMA)	VCS, CCB – Gold[2]	San Martin, Ucayali, Huánuco and Loreto Regions

Country	Project	Proposer	Standard	Location
Peru	Alto Huayabamba	Pur Project	VCS[2]	San Martín Region
Peru	Secure retirement: Agroforestry and reforestation with small farmers in Peru	Pur Project	VCS[3]	San Martín Region
Peru	Biocorredor Martin Sagrado REDD+ Project	Pur Project	VCS, CCB – Gold[4]	San Martín Region
Peru	Shaded coffee and cocoa reforestation project.	Société de gestion de projets ECOTIERRA Inc.	VCS[3]	Cajamarca, Amazonas, San Martín, Huánuco, Ucayali, Junín, Ayacucho, Cusco, Puno and Lambayeque Regions
Colombia	Forestry project for the Chinchina river basin, an environmental and productive alternative for the city and the region.	South Pole Carbon Asset Management S.A.S.	VCS[3]	Department of Caldas
Colombia	REDD+ in the Otún River forests	Empresa de Acueducto y Alcantarillado de Pereira S.A. E.S.P.	VCS[5]	Risaralda and Quindío
Colombia	Magnolios REDD+ Project	South Pole Carbon Asset Management S.A.S.	VCS[5]	Yarumal, Briceño, Valdivia and Santa Rosa de Osos Municipalities.
Colombia	Yagual - Grouped carbon sequestration project for restoration, conservation and sustainable production in the Guerrero, Sumapaz and Rabanal páramo systems.	Société de gestion de projets ECOTIERRA Inc.	VCS[4]	Bocayá, Cundinamarca, Huila and Meta
Colombia	Grouped project for the reduction of emissions from deforestation and forest degradation (REDD) in the Regional Natural Park: Biological Corridor PNN Purace-PNNN Cueva de los Guácharos.	Corporación Autónoma Regional del Río Grande de la Magdalena (CORMAGDALENA)	VCS, CCB – Gold[6]	Huila
Colombia	Regeneration of Colombian Coffee Plantation Ecosystems	PUR Desarrollo Pte. Ltd.	VCS[3]	La Sierra, Rosas, La Vega El Peñol, El Tambo, La Florida and Sandona
Colombia	Grouped project REDD+ conservation of the ecological corridor of Roble Guantiva - La Rusia - Iguaque	Natura Foundation	VCS, CCB – Gold[7]	Santander

Country	Project	Proposer	Standard	Location
Ecuador	Reforestation with native species in the Pachijal and Mira River Watersheds for carbon sequestration.	Mindo Cloud Forest Foundation	VCS, CCB – Gold[8]	Imbabura and Pichincha Provinces

[1] VCS Registered - CCB verification approval requested; [2] VCS Registered - CCB verification approved; 3 VCS Registered; [4] VCS Registered - CCB under verification; [5] VCS in development; [6] VCS Registration requested - CCB validation approved; [7] VCS Under validation - CCB under validation; [8] VCS in development - CCB validation expired.
Source: https://registry.verra.org/

Despite the relevance and accelerated progress of avoided deforestation projects, no concrete progress has been made in the creation of a large-scale funding mechanism. REDD+, as a cost-effective, results-based compensation and financing mechanism for forests, does not yet exist and concrete progress is based on a patchwork of isolated REDD+ projects and programs. Table 10.9 presents the number of registered REDD+ projects per country that eventually describe progress in the mechanism.

Table 10.9. Validated or verified REDD+ projects under the Verified Carbon Standard (VCS) or the Climate, Community and Biodiversity (CCB) Standard and Adaptation Strategies and Plans

Country	Registered VCS Projects/ AFOLU Projects (*)	CCB REDD Projects	National Adaptation Plans
Venezuela	0 / 0	0	Not reported
Colombia	59 / 33	10	Approved in 2016
Ecuador	3 / 1	0	In formulation based on 2012 national climate change strategy
Peru	28 / 21	4	In formulation
Bolivia	4 / 3	0	Not reported
Chile	25 / 3	1	Approved in 2014
Argentina	14 / 1	0	Included in national climate change adaptation and mitigation plan 2019

Source: Verified Carbon Standard (2020).
(*) AFOLU: Agriculture, Forestry Sector and Land Use Change

In order to contribute to the implementation of the Paris Agreement, the UNFCCC created the Green Climate Fund (GCF). This fund is the world's largest fund dedicated to supporting developing countries in reducing their greenhouse gas emissions and improving their capacity to respond to climate change.

The GCF aims to catalyze a flow of climate finance to invest in low-emission, climate-resilient development, driving a paradigm shift in the global response to climate change. An innovative element is the use of public funds to promote private investment. Currently, there are no projects being implemented in the hotspot; however, some countries already have concept notes submitted to the fund, as shown in Table 10.10.

Table 10.10. Projects submitted to the Green Climate Fund within the Tropical Andes Hotspot

Country	Project	Proposer	Status	Location
Peru	Strengthening the prevention and response to forest fires intensified by climate change in Peru.	Fondo Fiduciario Peruano para Parques Nacionales y Áreas Protegidas (PROFONANPE)	Concept Note	National
Peru	Scaling up the co-management model of communal reserves to reduce emissions and build the resilience of indigenous peoples in the Peruvian Amazon.	Conservation International (CI)	Concept Note	Amarakaeri Communal Reserve
Peru	Adaptation and Ecosystem Finance for Alpaca and Vicuña Herders (AbE-FAV)	Fondo Fiduciario Peruano para Parques Nacionales y Áreas Protegidas (PROFONANPE)	Concept Note	Cusco Region
Colombia	Heritage Colombia (HECO): Maximzing the contributions of sustainably managed landscapes in Colombia to the achievement of climate goals	WWF Colombia	Concept Note	National

Source: https://www.greenclimate.fund/

In recent years, adaptation measures have become more relevant due to significant changes in seasonal temperatures, length of seasons and increased frequency of extreme weather events, which demand practices that moderate the damages associated with climate change (Sánchez et al. 2015). The design and implementation of adaptation measures involve a multi-level (local, national, regional and international), multi-stakeholder (public, private and civil society) and multidisciplinary approach. It should, therefore, come as no surprise that the GCF has a larger number of adaptation projects than mitigation projects. Similarly, to ensure a multi-level approach, it has Designated National Authorities that ensure consistency with national priorities and are the interlocutors with the GCF and Accredited Entities responsible for implementing projects.

10.7 Civil Society's Role in Promoting Climate Change Adaptation and Mitigation

The involvement of civil society in the region in climate change policy formation and programs has resulted in important contributions in the form of policy engagement and the development of research with pilot activities. There are many civil society initiatives underway in all countries, providing an important complement to larger-scale official government initiatives (CEPF 2015; Aguilar et al. 2019). However, this engagement is still disproportionate to that undertaken by public entities. Analysis of conservation investment (see Chapter 11) shows that of the US$146.3 million invested in the two climate change-related themes between 2015 to 2019 in the hotspot, just 7.1 percent of those resources are allocated to civil society organizations (CSOs).

Civil society groups have actively promoted capacity building and technical assistance at multiple levels: regional and national governments and for local communities in Colombia, Ecuador, Peru and Bolivia. Leaders within CSOs working in this field include Corporación Ecoversa in Colombia; Amazónicos por la Amazonía (AMPA), Centro de Conservación, Investigación y Manejo de Áreas Naturales (CIMA), Sociedad Peruana de Derecho Ambiental (SPDA) and Asociación para la Investigación y Desarrollo Integral (AIDER) in Peru and Practical Action in Bolivia and Peru. International organizations dedicated to climate change include Wildlife Conservation Society (WCS), World Wildlife Fund (WWF), Conservation International (CI) and The Nature Conservancy (TNC).

In Argentina, the main actors that stand out for their participation in the definition of NDCs and their implementation are Fundación Ambiente y Recursos Naturales-FARN, Greenpeace Argentina and Fundación Vida Silvestre (Aguilar et al. 2019). In Chile, key civil society actors include the NGOs Terram, WWF Chile, Fiscalía del Medio Ambiente-FIMA and Adapt Chile (Aguilar et al. 2019).

At the regional level, several CSO networks are actively involved in climate change and REDD+ issues, including:

- Articulación Regional Amazónica (ARA), a network of CSOs from the Amazon region focuses on the exchange of information and experiences regarding policies and projects for forest conservation and development.
- Plataforma Climática Latinoamericana, a network of Latin American CSOs promoting the integration of climate change considerations as a priority for national and international policy making.
- Information Red Amazónica de Información SocioAmbiental Georferenciada (RAISG), which generates and disseminates data on 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 by its acronym in Spanish), with active engagement at the national and international policy level and several pilot projects under development.
- Red de Comunicación en Cambio Climático, LatinClima, is a climate change communication community and information center for Latin America and the Caribbean. Created in 2015, it is open to journalists and communicators, as well as other professionals, organizations and networks. It seeks to position the issue of climate change in the Latin American public both from the point of view of political advocacy to reduce GHG emissions and the adaptation of climate change impacts at all levels.

Of particular interest are the multi-stakeholder REDD+ working groups that include the REDD+ roundtables in Colombia, Ecuador and Peru, as well as at the subnational level. These working groups are playing an important role in helping to shape national and subnational REDD+ strategies, programs and policies (CEPF 2015; Aguilar et al. 2019). Meanwhile, Chile has the private sector Climate Leaders Group, and among other civil society actors, there are *Mesa Ciudadana de Cambio Climático* and the NDC Observatory (Aguilar et al. 2019).

As REDD+ evolves from its former focus on project activities towards broader policy and regulatory frameworks to reduce deforestation and promote low-emission rural development, civil society has an important opportunity to shape the planning, policy and investment decisions. It can also play a role in ensuring that biodiversity conservation objectives are in line with the REDD+ agenda (CEPF 2015; Samaniego et al. 2019).

Shaping public discussions, policies and investment decisions is probably the most important opportunity for civil society at the current REDD+ juncture. While there are many opportunities for civil society organizations to participate in government consultations, working groups and workshops, few have dedicated staff or budgets for this purpose. Participation at this level is both a valuable opportunity for CSOs and a net drain on limited institutional resources (CEPF 2015; Milano 2019).

Civil society has also played a particularly important role in developing offset projects for the voluntary carbon market since the inception of the forest carbon market, with most REDD+ projects in the hotspot and beyond being led by local and international NGOs. Although the market landscape for these projects is challenging, they often offer one of the few means of private sector finance for REDD+ and provide valuable learning experience on methodological issues, stakeholder engagement, and effectively combating deforestation at the local scale (CEPF 2015).

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, CSOs 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 (CEPF 2015; Aguilar et al. 2019; Milano 2019).

The role of civil society organizations in fulfilling climate commitments is addressed differently in each country.

In Venezuela, strategies and proposals to contribute to climate change describe the importance of the participation of organized citizens and grassroots movements (República Bolivariana de Venezuela 2017a and 2017b, Aguilar et al. 2019). However, there is limited evidence of effective civil society participation in the proposed commitments.

In the case of Colombia, it is worth highlighting how the state and civil society come together to share information about proposals and bring in non-state actors' perspectives, based on the principles of access to information and public participation (República de Colombia 2020). Nine territorial and sectorial climate change nodes have been established, in keeping with regional needs, to advance climate change mitigation, adaptation and risk management actions in a coordinated manner. Within this framework, CSOs, governors' offices, municipalities, environmental authorities, research institutes and other relevant institutions and organizations work in coordination with the Ministry of Environment and Sustainable Development to implement climate change policies, plans, projects and actions in their territories.

Also noteworthy is the active involvement of public and private sector bodies in developing the National Adaptation Plan, with the increasing integration of groups, such as indigenous people and women, that are traditionally under-represented in consultation processes. Therefore, the elaboration of the National Climate Change Adaptation Plan was also a process marked by active civil society participation (Republic of Colombia 2016b).

In Colombia, there are also other climate agreement spaces and processes, such as the:

- *Pilar Indígena Visión Amazonía,* or PIVA, which is directly related to indigenous communities;
- *Finanzas del Clima Colombia*, which is an annual event organized by the SISCLIMA Financial Management Committee;

- *Mesa Intersectorial para la Democracia Ambiental* (MIDA); and
- "*Saber Hacer Colombia*" strategy, which promotes the involvement of vulnerable populations in environmental projects (Milano 2019).

In Ecuador, civil society organizations stand out as collaborators and active members of groups and processes such as the REDD+ Working Group and the *Red Ecuatoriana de Cambio Climático* (RECC) (Republic of Ecuador 2016). Both contribute to a continuous process of climate change capacity building through thematic dialogues and full and effective participation. They also promote greater recognition of climate-related good practice by civil society actors, especially indigenous groups and women (Republic of Ecuador 2019). Since 2019, the National Climate Change Adaptation Plan has been under development, with support from UNDP and in coordination with civil society and all sectors. The process aims to achieve institutional and technical strengthening that stimulates both institutions and decision-makers to develop climate change policies and plans in their area of specialization.

In Peru, an active consultation and information process has been established with civil society, mainly through the REDD+ Peru group, which includes indigenous organizations, so that policy instruments such as the NDCs are developed in a transparent and participatory manner. Dissemination and awareness-raising activities on climate change reached a very high point with the staging of COP 20 in Lima. Currently, the management of the Peruvian NDCs includes consultations with civil society to define mechanisms for the implementation of mitigation and adaptation measures (Aguilar et al. 2019). An indigenous platform has recently been set up to facilitate dialogue between indigenous organizations and all levels of government. In 2021, the participatory process of updating Peru's National Climate Change Strategy, which will have a 2050 planning horizon, will begin (Republic of Peru 2020a). Already in 2020, the National Climate Change Adaptation Plan was developed in a participatory manner with CSOs.

In Bolivia, the need to include civil society in climate consultation and participation processes is recognized. The country's primary instrument for national and sectoral planning, the Social Economic Development Plan, or PDES by its acronym in Spanish, includes the issue of forests and integrates the strategy of horizontal and vertical articulation, which considers the participation of civil society (Aguilar et al. 2019).

Additionally, the NDCs consider community management of social organizations as a fundamental basis for achieving adaptive capacity, but without adding details on the form of implementation (Plurinational State of Bolivia 2015).

It is worth noting the significant role of international cooperation, through government agencies and NGOs, in providing and channeling the necessary resources to civil society organizations to implement interventions that improve the relationship with the public sector, as well as the decentralized generation and dissemination of information (Milano 2019). Additionally, the discussions and forums promoted by civil society have helped to define intervention complements, such as safeguards and other mechanisms, that should supplement the adaptation and mitigation actions to be implemented by national states in the framework of their climate commitments. In the region, there are signed agreements between governments, such as those of Norway, Germany and the United Kingdom with Colombia, Ecuador and Peru, to reduce deforestation and forest degradation in the framework of the actions described by their national environmental policy instruments (Gauna 2017).

10.8 Recommendations for Strengthening Adaptation and Mitigation Policies and Approaches

Based on the national consultations and the analysis conducted in this chapter, the six most salient recommendations for strengthening climate change adaptation and mitigation policies and approaches in the Tropical Andes Hotspot have been considered. They can be summarized as follows:

- Strengthen local government action, coordinated with national and subnational policies, for the development of sustainable economic activities, conservation of landscapes resilient to climate change and establishment of protected areas that efficiently contribute to biodiversity conservation and the maintenance of associated ecosystem services. For example, through conservation actions and maintenance of natural infrastructure:
    - Restoration of Andean forests and scrublands;
    - Management and conservation of springs and wetlands;
    - Protection of large sections of whole forests from Venezuela and Colombia to Argentina and Chile; and
    - Protection, management or restoration and maintenance of connectivity corridors and for the permanent production of ecosystem services.

- Encourage the control, and promote the management, of forest fires. This requires national fire management plans that include funding for equipment and capacity building for the selection of crop seeds of native species with proven adaptation to changes in climatic conditions, promotion of pollinators and native melliferous plant species, agricultural extension with an impact on good soil and water management practices, establishment of water reservoirs for times of scarcity, reduction in use of inorganic pesticides, containment of invasive exotic species, among others.

- Articulate conservation initiatives promoted by local governments and actors with the management of national protected areas systems and territorial planning, as well as with the management and public investment of sub-national governments. Protected area management plans should include climate change adaptation actions, as well as the valuation of the ecosystem services they provide, in close coordination with government planning at different levels, as well as with the livelihood plans of local populations.

- Strengthen the capacity of CSOs to access funding that contributes to national targets and comprehensive and innovative climate change management since, in the current scenario, adaptation costs in developing countries could range from US$140 to 300 billion per year by 2030. Despite climate risks, investment in the sector has barely reached US$22 billion in 2016 (Micale et al. 2018). KBAs such as the Zona Protectora Macizo Montañoso del Turimiquire in Venezuela (VEN26), Mindo y Estribaciones Occidentales del Volcán Pichincha (ECU44) in Ecuador or the Parque Nacional Natural Chingaza y alrededores (COL61) and the Parque Nacional Natural Farallones de Cali (COL65), both in Colombia, provide essential water supply services to nearby cities, with CSOs needing to catalyze funding for their conservation.

- Strengthen the capacity of local populations to engage in sustainable economic initiatives and promote their more active participation in awareness-raising, communication and education processes linked to the conservation of forests and other natural ecosystems throughout the hotspot. This may require increasing their knowledge and capacities on the importance of climate change adaptation and mitigation.

- Generate spaces for peer-to-peer exchange and learning among communities and local people to share experiences, achievements, common problems and initiatives in relation to forest management practices. These knowledge management processes should be documented and disseminated to share experiences and promote scaling up.

11 ASSESSMENT OF CURRENT CONSERVATION INVESTMENT

11.1 General Aspects

This chapter examines investments in natural resource management and biodiversity conservation in the Tropical Andes Hotspot between 2015 and 2019.

The analysis shows that public sources[33] and international donors[34] financed 1,229 investments for a total of US$676.6 million during the period of analysis, for a wide variety of projects related to natural resource management, which have been grouped into the following thematic areas:[35]

1. Species conservation
2. Planning, policy and institutional strengthening
3. Management of protected areas
4. Climate change: adaptation and mitigation
5. Community development and local governance
6. Watershed conservation
7. Sustainable management of forests and other natural resources
8. Capacity building
9. Landscape conservation and biological corridors
10. Climate change - REDD+
11. Biodiversity research and environmental monitoring
12. Economic incentives for conservation

Approximately 48 percent of this funding (US$323.6 million) went to support programs at the national level that benefited the seven hotspot countries, while 52 percent (US$353.0 million)

---

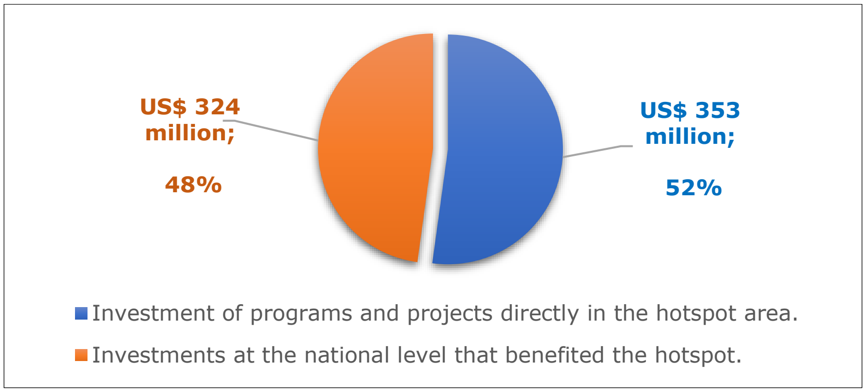
[33] Public sources include national governments, regional governments, as well as other public sources from the non-financial sector in the hotspot countries (local governments, institutes, universities, etc.).

[34] Among international donors, the profile considered bilateral donors, multilateral donors, foundations and other international donors (e.g., investment from the Corporate Social Responsibility areas of some companies). In the case of foundations, we considered those projects whose main objectives were natural resource management. Other projects that finance human rights, poverty alleviation and democracy issues have been omitted, even if they had some environmental components among their actions.

[35] Includes investments made between January 1, 2015 and December 31, 2019, organized by source (national, bilateral, multilateral, foundations, public and private sectors, and strategic financing initiatives), country, and thematic areas. Data are from internet sources and direct donor consultations. All investments were entered into an Excel table containing data on: project name, start and end date, whether it is a regional project or not, donor name, type of donor, whether public or private, country(ies) that received the investment, project location (at district, municipality, province or similar level), whether the project location is within a prioritized corridor or not, thematic (in the case of species conservation the taxon was specified), total amount of the project, amount of co-financing in cash, whether the project received co-financing in kind or not, adjustment of the total amount by area and years, adjusted amount, project executor, type of executor (if CSO or not), project reference and project objective.
In addition, the following was taken into account when registering the projects:
i. Avoid double counting of investments.
ii. Country-level investments that were not specifically targeted to the Tropical Andes region were adjusted for the proportion of the country within the hotspot. This is a representative value that assumes that country-level investments were evenly distributed throughout the country, which could over or underestimate actual expenditures directed to hotspot conservation.
iii. Only those investments that affected at least 20 percent of the hotspot area were included (thus excluding investments at the country level in Argentina, Chile and Venezuela).
iv. Data collection relied on publicly available sources describing conservation investments and it is likely that some funding sources and projects were omitted and others may have been over or underestimated. In some cases where information was not publicly available, donors were contacted directly.
v. Data related to national investment in protected area management were limited for the hotspot countries and, when available, budgets for individual protected areas were not disaggregated.

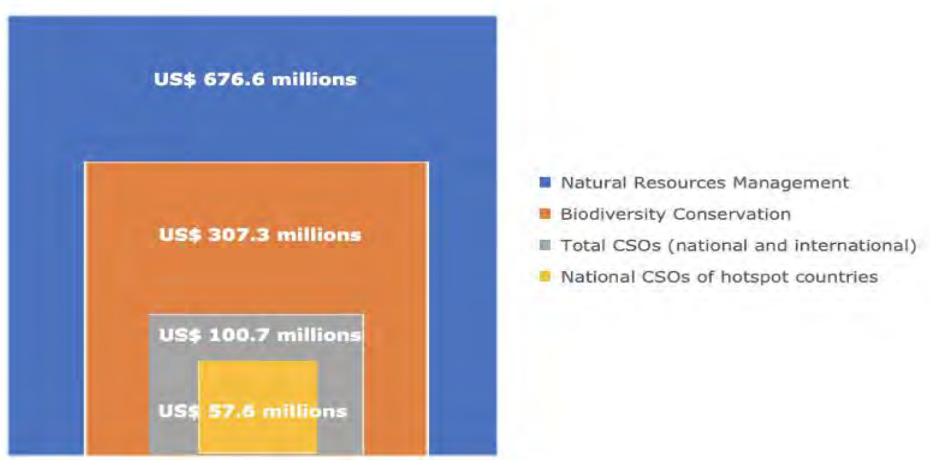
was invested in supporting programs and projects directly in the hotspot area in the seven countries (Figure 11.1). On average, total investments are equivalent to US$70.6 million per year for projects in the hotspot.

Figure 11.1. Direct Investment in the Tropical Andes Hotspot and at the National Level for Natural Resource Management and Biodiversity Conservation (Total = US$676.6 million), 2015 - 2019



Of the total amount, as shown in Figure 11.2, US$307.3 million (45.4 percent) was channeled to activities that had biodiversity conservation as their primary objective. About 14.9 percent of the total funds, the equivalent of US$100.7 million, were channeled through CSOs,[36] however, only US$57.6 million (8.5 percent) went to projects executed by national CSOs based in one of the seven hotspot countries, while US$43 million was implemented by large international CSOs.

Figure 11.2. Breakdown of Investment for Natural Resource Management and Biodiversity Conservation in the Hotspot, 2015 -2019



[36] A distinction was made between the execution of projects by national CSOs based in one of the hotspot countries and international CSOs (generally large foreign non-governmental organizations), such as WWF, Conservation International, Nature and Culture International and WCS, among others. These international CSOs executed fewer projects but with a much larger amount per project than national CSOs (see Chapter 11.3).

This section compares investments identified between the first and second ecosystem profiles for the Tropical Andes, for Phase I from 2009 – 2013 and for Phase II from 2015 – 2019. This comparative analysis should be considered as is indicative rather than conclusive due to differences in the ability of the profiing teams to access information on conservation investments and to slight methodological variations in assessing these investments.

Between the two periods under review, there appears to be a slight increase of US$62 million in the total investment in natural resource management in the hotspot. However, investment in biodiversity conservation fell by about US$28.7 million. It is worth noting that for the period 2015 – 2019, 1,229 investments were analyzed for a total of US$676.6 million (with an average of US$550,566 per investment) while for the previous CEPF period, 2009 – 2013, 712 investments were analyzed for a total of US$614.6 million (with an average of US$863,000 per investment). Thus, more investments would have been made, but with a smaller amount per investment than during CEPF Phase I.

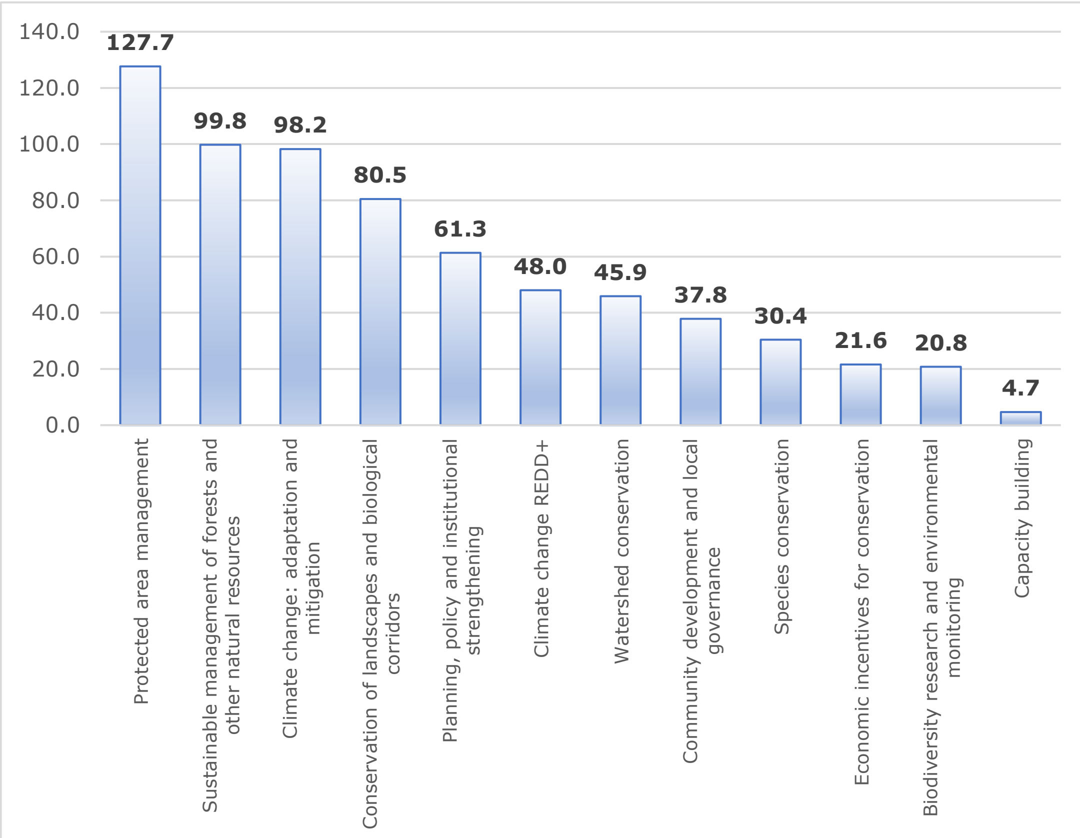
Table 11.1. Investment Difference Between the 2009 - 2013 and 2015 - 2019 Periods

Investment characteristics	Amount for the 2009 - 2013 period (US$ millions)	Amount for the 2015 - 2019 period (US$ million)	Difference (US$ million)
Natural resource management	614.6	676.6	62.0
Biodiversity conservation	336	307.3	-28.7

11.2 Thematic Distribution of Hotspot Investment

Funding for natural resource management was spread across 12 thematic areas, as shown in Figure 11.3. Four thematic areas accounted for almost 60 percent of all investments: 1) protected area management (18.9 percent); 2) sustainable management of forests and other natural resources (14.7 percent); 3) climate change adaptation and mitigation (14.5 percent); and 4) landscape and biological corridor conservation (11.9 percent). Capacity building received the least amount of investment, accounting for only 0.7 percent of the total investment in natural resource management within the hotspot.

Figure 11.3. Investment in Natural Resource Management in the Tropical Andes Hotspot by Theme for the 2015 - 2019 Period (Total US$676.6 million)



11.2.1 Investments in Biodiversity Conservation

A total of US$307.3 million directly supported biodiversity conservation within the following five thematic areas: 1) protected area management; 2) landscape and biological corridor conservation; 3) climate change-REDD+; 4) species conservation; and 5) biodiversity research.

Protected Area Management

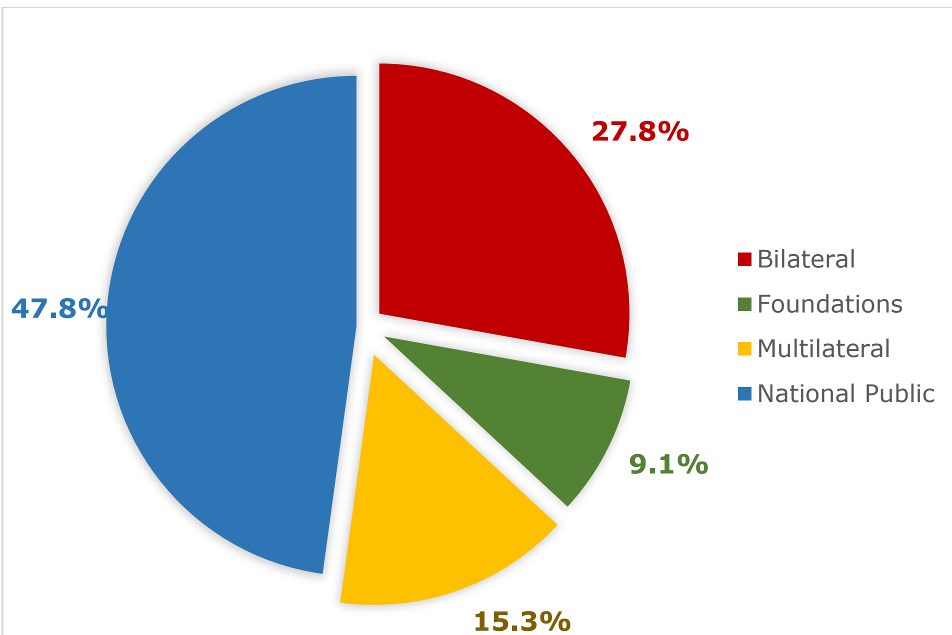
Protected area management in the hotspot received US$127.7 million, approximately US$33.9 million less than in the previous period (2009 - 2013). As will be described subsequently for each country, even when this is the most funded theme in the hotspot, this amount falls far short from what is needed to support adequate and effective management of protected areas in the hotspot countries, based on official documents published by governments about the sustainability of their protected natural areas systems.[37]

---

[37] Peru: RM 200-2016-MINAM (https://www.minam.gob.pe/wp-content/uploads/2016/07/RM-N%C2%B0-200-2016-MINAM.pdf) ; Bolivia: Ministry of Environment and Water (http://sernap.gob.bo/wp-content/uploads/2018/08/PEI-SERNAP-2016-2020_Final-Articulado.pdf) ; Colombia: PNN and MINAMBIENTE (https://www.parquesnacionales.gov.co/portal/wp-content/uploads/2018/08/brecha-financiera-pag-web.pdf) and (https://www.parquesnacionales.gov.co/portal/wp-content/uploads/2018/08/Modelo-escenarios-brecha-DTAN-DTCA-Version-Final-06AGOSTO2018.pdf).

Less than half of the funding for protected areas in the hotspot comes from the national governments[38] (47.8 percent) and the remainder comes from external sources (approximately 52.2 percent). Of the US$127.7 million in funding allocated to protected areas in the hotspot, US$35.5 million (27.8 percent) has come from bilateral sources. Among these, KfW, the state-owned development bank of the Federal Republic of Germany, stands out, with its agreements to finance protected area systems in Peru, Colombia and Ecuador. In Bolivia, KfW provided funding until 2013. On the other hand, multilateral sources financed US$21.8 million, particularly the Global Environment Facility (GEF), the United Nations Development Program (UNDP) and the Inter-American Development Bank (IDB). CEPF is estimated to have provided approximately US$3.2 million for the hotspot's protected areas. Finally, foundations funded US$11.6 million, mostly through the Moore Foundation and Andes Amazon Fund (Figure 11.4).

Figure 11.4. Funding Percentage for Protected Areas by type of Financial Source, 2015 – 2019



In terms of funding by country, the least funding for protected areas in the hotspot has been in Bolivia (US$9.1 million, 9.1 percent), although in this particular case, the investment could be underestimated due to restrictions in access to public information. In relation to the surface area of the hotspot's protected areas, Colombia was the country that received the most resources (Table 11.2).

[38] Mostly from central governments.

Table 11.2. Funding for Protected Areas in the Tropical Andes Hotspot by Country, 2015 to 2019

Country	Size of protected areas in the hotspot (ha)	Total funding (US$ million) (2015 - 2019)	Average funding per year (US$ million)	Average hotspot funding per hectare per year (US$)
Argentina	5,349,965.8	Not available	Not available	Not available
Bolivia	9,923,061.9	9.1	1.8	0.18
Chile	810,670.8	Not available	Not available	Not available
Colombia	9,034,801.9	51.8	10.4	1.15
Ecuador	5,737,404.4	17.7	3.5	0.62
Peru	10,004,274.4	49.0	9.8	0.98
Venezuela	1,901,862.3	Not available	Not available	Not available

Bolivia

The type of funding source that contributed the most to the system was bilateral (US$3.2 million). Although the European Union supported Bolivia's SNAP for five years (2011 - 2015) with more than US$11 million, from 2015 onwards, it invested less than US$1 million. This was done primarily through the project "Deciding Our Future: Sustainable Management of the Municipal Protected Areas of Ixiamas, with a territorial approach for local development".

The donor group that contributed second most to Bolivia's protected areas in the hotspot is private foundations. Some US$ 2.7 million (29.7 percent) was channeled into the country by foundations, mainly through the Moore Foundation and the Andes Amazon Fund.

Multilateral cooperation accounted for 11.5 percent of all funding, with support from the CEPF totaling an estimated US$499.637.

The SNAP also received almost US$2.3 million through the *Fundación para El Desarrollo Del Sistema Nacional de Áreas Protegidas* (FUNDESNAP by its acronym in Spanish),[39] which channeled funding from organizations such as the Moore Foundation, the World Bank and DANIDA, among others.

The estimated US$9.1 million in funding for the protected areas of the hotspot in Bolivia (2015 - 2019) is far from what is required to meet their needs. In fact, in its Institutional Strategic Plan 2016-2020, the National Protected Areas Service (SERNAP by its acronym in Spanish[40]) estimated that more than twice that amount (around US$20.2 million) would be needed to effectively manage the protected areas of the Bolivian portion of the hotspot.

Colombia

Although Colombia received significant support through bilateral (especially from KfW and USAID) and multilateral cooperation, it was national public funding that contributed the most

[39] This foundation (FUNDESNAP) is a Conservation Patrimony Fund (CPF). CPFs are legally independent, private and mixed donor institutions that make grants that can be used to support the long-term costs of protected areas and biodiversity conservation, among other goals.
[40] http://sernap.gob.bo/wp-content/uploads/2018/08/PEI-SERNAP-2016-2020_Final-Articulado.pdf

to the protected areas in the Colombian hotspot. This public investment represented approximately 62.7 percent of the total (US$32.5 million) for the country.

Bilateral cooperation funded an estimated US$4.5 million in the protected areas of the Colombian hotspot through KfW's "Biological Diversity and Protected Areas of Colombia" Program.

Multilateral cooperation financed more than US$8.1 million in the protected areas of the Colombian hotspot, mainly through the GEF and the IDB. In addition, foundations invested more than US$ 1.3 million. This sum included funds from the Moore Foundation and the Andes Amazon Fund.

Finally, the Natural Heritage Fund is a mixed[41] (public and private) entity that channeled close to US$8.3 million from Colombian public entities (Regional Autonomous Corporations, among others), foundations (mainly the Andes Amazon Fund and the Moore Foundation) and multilateral sources (mainly GEF).

The US$51.8 million funding provided for the SINAP areas included in the hotspot would also be insufficient to ensure the sustainability of the system. The document "Estimation of the Financial Gap of the Protected Areas of the National Natural Parks System" (2018) of the Sustainability and Environmental Business Sub-Directorate of National Natural Parks (PNN by its acronym in Spanish) of Colombia,[42] acknowledged that for an initial scenario (including only the basic needs necessary for operation and maintenance of the system), an estimated US$ 8.9 million more per year would be needed. For an improved baseline scenario (including needs to improve efficiency) an estimated US$ 12.9 million more per year would be needed, and for an optimal scenario, an estimated US$21.6 million more per year would be needed for the protected areas of the Colombian hotspot.

Ecuador

An estimated of US$17.7 million in funding was allocated for the protected areas of the hotspot in Ecuador between 2015 and 2019.

Ecuador's National System of Protected Areas (SNAP by its acronym in Spanish) receives technical and financial cooperation under three mechanisms:

- Endowment through the Protected Areas Fund (FAP by its acronym in Spanish), covering basic operating expenses for 42 protected areas (out of 60 that are part of the SNAP). This fund is administered by the Sustainable Environmental Investment Fund (FIAS by its acronym in Spanish).
- Donations, including:
    - Specific contributions from GEF projects, contributions from water funds and other environmental funds of subnational governments.
    - International cooperation
    - Companies (minor contributions from hydroelectric and other companies under the concept of corporate social responsibility)
- Tax allocations

[41] It is a Conservation Patrimony Fund, as is FUNDESNAP (Bolivia).
[42] https://www.parquesnacionales.gov.co/portal/wp-content/uploads/2018/08/brecha-financiera-pag-web.pdf

It is estimated that bilateral financial sources have contributed the most to the protected areas of the Ecuadorian hotspot (37.8 percent), with contributions of more than US$6.7 million from KfW, followed by multilaterals (28.7 percent), with contributions of around US$4.2 million and almost US$1 million from CEPF, followed by national public funding (28.6 percent) and foundations (5 percent). Foundations provided almost US$1 million for protected areas in the Ecuadorian hotspot through the Moore Foundation and Andes Amazon Fund.

Large projects, such as the SNAP Support Program (with a budget of around US$5 million), indicated that there were also important gaps in Ecuador's National Protected Areas System.

Peru

In Peru, there has been an investment of US$49 million for protected areas in its hotspot, with greater investment from international cooperation agencies (56.4 percent) than from state public financing. Bilateral cooperation stands out with 32.1 percent of total investment. Most of the financing has come from KfW, through the different agreements obtained with the Peruvian government in recent years for the financing of the National System of Natural Areas Protected by the State (SINANPE by its acronym in Spanish) between 2015 and 2019. Thus, it can be seen that more than US$50 million has been allocated to Peru's protected areas in recent years through KfW,[43] of which an estimated US$10 million have financed protected areas in the Peruvian hotspot. KfW will also continue to finance SINANPE in the coming years, having extended its commitment through a new agreement signed at the end of 2020.[44]

On the other hand, multilateral sources financed about US$5.3 million (10.8 percent), mainly through GEF, and foundations financed US$ 6.6 million (13.5 percent), with major contributions from the Moore Foundation, Andes Amazon Fund and Rainforest Trust.

Finally, the *Fondo de Promoción de la Áreas Naturales Protegidas del Perú* (PROFONANPE by its acronym in Spanish), an endowment fund in Peru, channeled approximately US$4.5 million for the conservation and management of SINANPE. The funds were channeled from multilateral organizations (GEF), bilateral organizations (KfW), and the Moore Foundation.

According to the Financial Plan of the National Service of State Protected Areas (SERNANP by its acronym in Spanish),[45] funding needs for the protected areas of the hotspot in Peru were estimated at more than US$10.3 million per year.

The following figure and table show a summary of financing by type, amount and percentage in each of the four countries described.

[43] https://www.sernanp.gob.pe/noticias-leer-mas/-/publicaciones/c/minam-y-sernanp-reciben-del-gobierno-aleman-una-de-las-252612
[44] https://www.gob.pe/institucion/mef/noticias/321977-mef-y-banco-de-desarrollo-aleman-kfw-firman-acuerdo-por-20-millones-de-euros-para-conservacion-de-12-areas-naturales-protegidas
[45] https://www.minam.gob.pe/wp-content/uploads/2016/07/RM-N%C2%B0-200-2016-MINAM.pdf

Figure 11.5. Funding in Protected Areas by Country by Source, 2015 - 2019

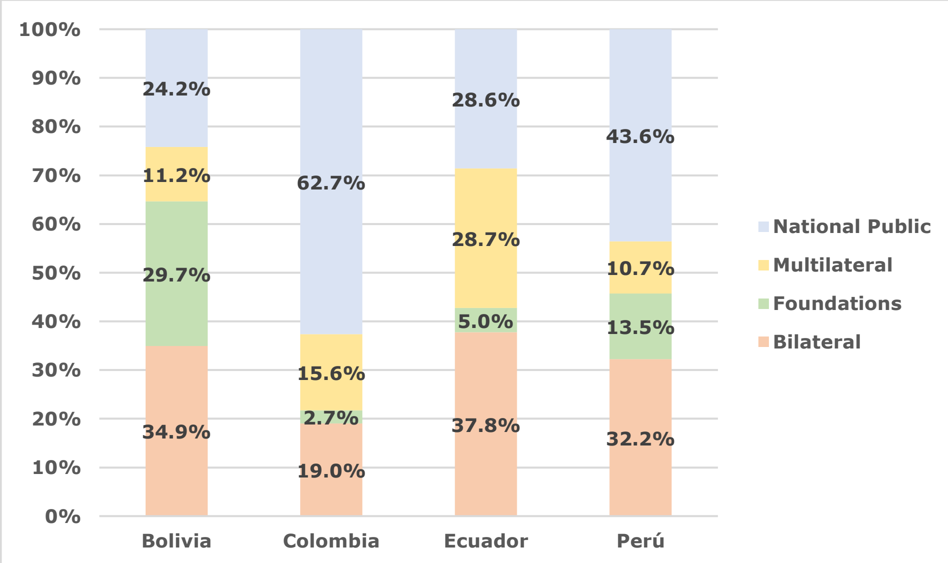


Table 11.3. Protected Area Financing by Country by Source (in US$ million), 2015 to 2019

Source	Bolivia	Colombia	Ecuador	Peru
Bilateral	3.2	9.9	6.7	15.7
Foundations	2.7	1.4	0.9	6.6
Multilateral	1.0	8.1	5.1	5.3
National public	2.2	32.5	5.1	21.3
Total	9.1	51.8	17.7	49.0

In conclusion, taking into account the US$33.94 reduction with respect to the previous investment period, and the national governments' declarations regarding funding gaps (needs) for their protected area systems, it would be necessary to increase investment in protected areas in the hotspot by several tens of millions of dollars per year.

Landscape Conservation and Biological Corridors

Landscape conservation and biological corridors include projects that support sustainable landscape management,[46] improvements to connectivity and sustainable production in large landscape areas and biodiversity corridors, as well as mitigating the impacts of large-scale transport infrastructure and extractive industry projects.

A total of US$80.5 million was invested in this theme in the hotspot during the period under study, about US$15 million less than in the previous period (2009 - 2013).

Most of the investment in this area was made in Peru (44.1 percent), approximately US$35.5 million, followed by Ecuador (22.4 percent), Colombia (19.9 percent) and Bolivia (13.5 percent) (see Table 11.4). National public sources have funded landscape and biological

[46] Landscape is defined as any part of the territory as perceived by the population, whose character is the result of the action and interaction of natural and/or human factors.

corridor conservation the most (US$30.1 million, 37.4 percent) followed by multilateral funding (US$24.5 million, 30.4 percent), see Table 11.5.

Table 11.4. Investment in Landscape Conservation and Biological Corridors by Country, 2015 – 2019

Country	Total investment (US$ million)	Percentage
Argentina	0.0	0.0
Bolivia	10.8	13.5
Chile	0.0	0.0
Colombia	16.0	19.9
Ecuador	18.0	22.4
Peru	35.5	44.1
Venezuela	0.1	0.1
Total	80.5	100.0

Table 11.5. Investment in Landscape Conservation and Biological Corridors by Source

Source	Total investment (US$ million)	Percentage
Bilateral	13.5	16.8
Foundations	12.4	15.4
Multilateral	24.5	30.4
Other donors	0.0	0.0
National public	30.1	37.4
Total	80.5	100.0

In Peru, the outstanding USAID project "Alliance for Sustainable Landscapes - SLP-P" financed an estimated US$2 million in Moyobamba and Rioja in the 2015 - 2019 period. In Ecuador, it is estimated that the "National Program for Forest Restoration for Environmental Conservation, Watershed Protection and Alternative Benefits", with Ecuadorian public funding, financed close to US$13 million in the hotspot for the 2015 - 2019 period.

One regional initiative was and will be of particular relevance in the coming decade.[47] The "Supporting Initiative 20x20: a country-led effort to bring 20 million hectares of degraded land in Latin America and the Caribbean into restoration by 2020" project was channeled through the International Climate Initiative (IKI), which is managed by the Federal Ministry for the Environment, Nature Conservation and Security (BMU). The 20x20 Initiative is a country-led effort that seeks to change the dynamics of land degradation in Latin America and the Caribbean through protection and restoration of 20 million hectares of forests, farms, grasslands and other landscapes by 2020. The initiative, formally launched at COP 20 in Lima, supports the Bonn Challenge, a global commitment to restore 150 million hectares of the world's deforested and degraded lands by 2020, and the New York Declaration on Forests which aims to restore 350 million hectares by 2030.

Climate Change-REDD+

[47] UN New Decade for Ecosystem Restoration (https://www.unenvironment.org/es/noticias-y-reportajes/comunicado-de-prensa/nueva-decada-de-la-onu-para-la-restauracion-de-los).

REDD+ projects reduced their funding by US$10.7 million, from US$58.7 million in the 2009 - 2013 period to US$48.0 million in the period 2015 -2019.

The country that received the most funding under this facility is Ecuador (US$30.1 million, 62.6 percent), followed by Peru (US$10.6 million, 22 percent) and Colombia (US$7.1 million, 14.9 percent) (Table 11.6).

Table 11.6. Climate Change Investment - REDD+ by Country, 2015 - 2019

Country	Total investment (US$ million)	Percentage
Argentina	0.0	0.0
Bolivia	0.2	0.4
Chile	0.0	0.1
Colombia	7.1	14.9
Ecuador	30.1	62.6
Peru	10.6	22.0
Venezuela	0.0	0.0
Total	48.0	100.0

Bilateral sources were the largest contributors (US$26.8 million, 55.8 percent), with donors such as the Norwegian Agency for International Development (NORAD), that donated US$4.4 million to implement projects such as "Involving local communities in the fight against climate change", and KfW, that invested an estimated US$16 million, through outstanding projects such as the "Forest Conservation and REDD+ Program", which also received Ecuadorian public funding. After bilateral sources, multilateral sources have been the second most important source (US$15.4 million, 32.1 percent). Among the most outstanding projects, the "Financial and land use planning instruments to reduce emissions from deforestation" financed by the Green Climate Fund (GCF) stands out with an estimated impact on the hotspot of US$9.4 million. Finally, other donors include the Walt Disney Company, through its corporate social responsibility commitment, which provided US$3.5 million to Conservation International for conservation in Alto Mayo (Peru). See Table 11.7.

The larger REDD+ agreements, programs and projects implemented by national governments are generally financed through international cooperation,[48] with co-financing from the national governments. Given that deforestation is generally the main cause of greenhouse gas (GHG) emissions in several hotspot countries, it might be interesting to further encourage this type of investment.

Table 11.7. Climate Change Investment - REDD+ by Source, 2015 – 2019

Source	Total investment (US$ million)	Percentage
Bilateral	26.8	55.8
Foundations	0.0	0.0
Multilateral	15.4	32.1

[48] For example, the Joint Declaration of Intent (JIU) on REDD - Between Peru, Norway and Germany (https://sinia.minam.gob.pe/documentos/declaracion-conjunta-intencion-dci-redd-entre-peru-noruega-alemania)

Other donors	3.5	7.3
National public	2.3	4.9
Total	48.0	100.0

Biodiversity Research and Environmental Monitoring

Many projects include activities and actions in biodiversity research and environmental monitoring among their components; thus, it is difficult to differentiate the specific amount allocated to this area. However, according to the methodology applied, biodiversity research and environmental monitoring would have experienced an increase with respect to the previous period, going from US$10.7 million between 2009 and 2013 to US$20.8 million between 2015 and 2019. The countries that have benefited most in this area are Colombia (US$10.6 million or 51.1 percent) and Peru (US$7.8 million or 37.5 percent). See Table 11.8.

Table 11.8. Investment in Biodiversity Research and Environmental Monitoring by Country, 2015 to 2019

Country	Total investment (US$ million)	Percentage
Argentina	0.0	0.0
Bolivia	0.3	1.2
Chile	0.0	0.1
Colombia	10.6	51.1
Ecuador	2.1	10.0
Peru	7.8	37.5
Venezuela	0.0	0.0
Total	20.8	100.0

By source, there is a similar proportion (50/50) between national government and international cooperation financing (Table 11.9).

Table 11.9. Investment in Biodiversity Research and Environmental Monitoring by Source, 2015 – 2019

Source	Total investment (US$ million)	Percentage
Bilateral	4.2	20.3
Foundations	1.6	7.9
Multilateral	4.5	21.8
Other donors	0.0	0.0
National public	10.4	50.0
Total	20.8	100.0

Among the international cooperation funding sources, multilateral donors (US$4.5 million, 21.8 percent) and bilateral donors (US$4.2 million, 20.3 percent) stand out. Among the former, CEPF financed close to US$0.5 million through seven projects on this theme for all hotspot countries, and among the latter, KfW co-financed the "support for national forest monitoring" in Ecuador (with an estimated US$1.1 million). Among the public financing by the national governments, Colombia's financing stands out, through investments such as "Strengthening of planning, evaluation and follow-up processes for the management carried out by the environmental sector at the national level," "Strengthening and consolidation of the Colombian environmental information system (SIAC by its acronym in Spanish)" and "Research and production of knowledge for the integrated management of biodiversity and ecosystem services in the national territory," among others.

Species Conservation

Many biodiversity investments have species conservation among their objectives, although it is difficult to differentiate the amount of funding directed specifically to this subject area. For the 2015 - 2019 period, funding was estimated at US$30.4 million, which represents an increase of US$20.5 million over the previous period.

The country that benefited the most was Ecuador (US$21.0 million, 69.1 percent) and by source, foundations were the largest funding source (US$11.1 million, 36.5 percent). See Tables 11.10 and 11.11.

Table 11.10. Species Conservation Investment by Country and Percentage of Total, 2015 – 2019

Country	Total investment (US$ million)	Percentage
Argentina	0.0	0.0
Bolivia	0.7	2.2
Chile	0.0	0.1
Colombia	5.1	16.8
Ecuador	21.0	69.1
Peru	3.6	11.7
Venezuela	0.0	0.1
Total	30.4	100.0

Table 11.11. Investment in Species Conservation by Source and Percentage of Total, 2015 – 2019

Source	Total investment (US$ million)	Percentage
Bilateral	3.8	12.6
Foundations	11.1	36.5
Multilateral	7.2	23.8
Other donors	0.0	0.0
National public	8.2	27.1
Total	30.4	100.0

Almost a third of the funding for species conservation (US$10.3 million) was included in a single project, the "Conservation of Ecuadorian amphibian diversity and sustainable use of their genetic resources",[49] co-financed by various stakeholders, including GEF, UNDP, the Jambatu and Amaru foundations and Ecuador's national and local governments, among others. Other important projects have been the "Protection of Critical Wintering Habitat for Neotropical Migratory Birds in Ecuador," funded by the U.S. Fish and Wildlife Service (USFWS) (US$1.0 million) for the protection of the Canada warbler and its wintering ecosystems, or the "Saving

[49] https://www.thegef.org/project/conservation-ecuadorian-amphibian-diversity-and-sustainable-use-its-genetic-resources

the largest remaining Chocó forest corridor in western Ecuador" project funded by the Rainforest Trust Foundation (US$2.0 million), which promoted the conservation of species such as the brown-headed spider monkey, the glass frog, the green macaw, the jaguar and the banded ground cuckoo. CEPF has made a particularly important contribution for species conservation, providing US$1.4 million in 29 projects.

At the level of taxonomic groups, amphibians are the largest recipients of species-focused funding (42 percent of the total amount financed), followed by birds (31 percent), mammals (29.9 percent) and plants (11.4 percent). Only about 1.5 percent of the total was invested in the protection of reptiles, fish and insects. While project funding for these fauna may not be as attractive, insect, fish and reptile species are basic food sources for birds and mammals. Thus, conservation of their habitats could improve their conservation status and ultimately the integrity of the entire food chain.

As described in Chapter 6, illegal wildlife trafficking and hunting is a significant threat to Andean species. The profile identifies eight projects engaging in this issue at national and regional levels; none specifically target the problem within the hotspot. Their total budget is US$5.1 million, and they are funded by NORAD, USFWS and the European Union. These projects mostly support policy and institutional strengthening, particularly for national and local governments, to tackle illegal wildlife trafficking and hunting.

11.2.2 Other Natural Resources Management Investments

Investment in other natural resource management issues, apart from the categories mentioned in the previous section, amounted to US$369.3 million and often supported initiatives that indirectly benefit biodiversity. These included sustainable management of forests and other natural resources, climate change adaptation and mitigation, planning, policy and institutional strengthening, watershed conservation, community development and local governance, leveraging economic incentives for conservation and capacity building.

Climate Change Adaptation and Mitigation

Climate change adaptation and mitigation funding experienced an increase of US$7.1 million over the previous period, from US$91.1 million in the period 2009 - 2013 to US$98.2 million for the period 2015 - 2019.

The countries that benefited most were Bolivia (US$33.2 million, 33.8 percent) and Ecuador (US$31.2 million, 31.7 percent). See Table 11.12.

Table 11.12. Investment in Climate Change Adaptation and Mitigation by Country in the Tropical Andes Hotspot, 2015 - 2019

Country	Total investment (US$ million)	Percentage
Argentina	0.4	0.4
Bolivia	33.2	33.8
Chile	0.8	0.8
Colombia	14.2	14.5
Ecuador	31.2	31.7
Peru	17.0	17.3
Venezuela	1.4	1.4
Total	98.2	100.0

By source, bilateral sources invested the most in climate change adaptation and mitigation in the hotspot (US$57.2 million, 58.2 percent), followed by multilateral sources (US$24.1 million, 24.5 percent). National public financing contributed 16.9 percent of the investment in this area, which seems to be an underestimate since hydroelectric or other clean energy projects were not considered in the methodology, which add up to large amounts and are financed by national governments. In that sense, countries are making great efforts to determine public spending on mitigation and adaptation, as part of the national climate finance strategic planning (Table 11.13).

Table 11.13. Investment in Climate Change Adaptation and Mitigation by Source in the Tropical Andes Hotspot, 2015 - 2019

Source	Total investment (US$ million)	Percentage
Bilateral	57.2	58.2
Foundations	0.0	0.0
Multilateral	24.1	24.5
Other donors	0.3	0.3
National public	16.6	16.9
Total	98.2	100.0

Among bilateral sources, the Swiss Cooperation financed around US$22 million in projects such as "*Biocultura*" (Bolivia, US$4.7 million), "Sharing knowledge and experiences to protect Andean forest ecosystems" (in the seven countries of the hotspot, US$8.9 million) or phase II of the "Andean Forests Program" (in the seven countries of the hotspot, US$1.2 million). On the other hand, German cooperation, through the BMU and the German Agency for International Cooperation (GIZ), financed US$16.3 million in the climate change adaptation and mitigation hotspot, including the "Strengthening resilience to climate change through the protection and sustainable use of fragile ecosystems; ProCamBío II" project, Ecuador (US$4.4 million).

Multilateral sources include the World Bank, GEF, and the Nordic Development Fund (NDF). Projects to note include the "Climate Change Resilience and Integrated Watershed Management Project in Bolivia," financed by the World Bank in Bolivia (US$4.16 million) and the "Ecuador NDC Support Program," co-financed by UNDP, the European Union, and GIZ[50] (US$3.0 million). In addition, the "Promotion of climate-smart livestock management that integrates the reversal of land degradation and the reduction of desertification risks in vulnerable provinces" project in Ecuador, was financed by the Food and Agriculture Organization of the United Nations (FAO) with an estimated US$2.9 million in the hotspot. Finally, the Nordic Development Fund's "Pilot adaptation action plan for high inter-valley communities" invested nearly US$2.1 million in Bolivia.

Economic Incentives for Conservation

The economic incentives for conservation theme include all those projects that stimulate a green and sustainable economy, the improvement of market accessibility to biodiversity products and ecosystem services payment. This includes projects that enhance the value of the natural capital of ecosystems, thus increasing their economic, environmental and social interest and providing conservation incentives.

[50] European Union and GIZ are bilateral donors.

The execution of these types of projects for the current period amounts to US$21.6 million, with an increase of US$10.7 million with respect to the previous period (2009 - 2013). Its development has been more important in two of the hotspot countries, Ecuador (US$9.4 million, 43.3 percent) and Colombia (US$8.6 million, 39.7 percent) have benefited the most in this area. Only US$2.7 million has been financed in Peru and US$0.8 million in Bolivia (Table 11.14). These types of projects are important because they encourage sustainable development by linking the economy, society and the environment - the three legs of sustainability.

Table 11.14 Investment in Economic Incentives for Conservation by Country in the Tropical Andes Hotspot, 2015 – 2019

Country	Total investment (US$ million)	Percentage
Argentina	0.0	0.1
Bolivia	0.8	3.9
Chile	0.0	0.1
Colombia	8.6	39.7
Ecuador	9.4	43.3
Peru	2.7	12.6
Venezuela	0.1	0.2
Total	21.6	100.0

By source, 54.7 percent of funding comes from international cooperation (47.5 percent from bilateral sources, 6.7 percent from multilateral sources and 0.5 percent from foundations). On the other hand, 45.3 percent of funding comes from national public sources, which have financed some payment for environmental services projects. In the case of Peru, this mechanism is already regulated by Law Nº 30215 - Law on mechanisms of retribution for ecosystem services.[51] See Table 11.15.

Table 11.15. Investment in Economic Incentives for Natural Resource Management by Source in the Tropical Andes Hotspot, 2015 – 2019

Source	Total investment (US$ million)	Percentage
Bilateral	10.2	47.5
Foundations	0.1	0.5
Multilateral	1.4	6.7
Other donors	0.0	0.0
National public	9.8	45.3
Total	21.5	100.0

Among the most important projects is the "Socio Bosque" project (Ecuador), co-financed by the Ecuadorian government and KfW, with an estimated US$5.3 million for the 2015 - 2019 period in the hotspot. Socio Bosque[52] provides economic incentives to farmers and indigenous communities that voluntarily commit to the conservation and protection of their native forests, páramos or other native vegetation. On the other hand, Peru implements Conditional Direct

[51] http://www.fao.org/faolex/results/details/es/c/LEX-FAOC135640/
[52] http://sociobosque.ambiente.gob.ec/

Transfers (TDC by its acronym in Spanish)[53], which provide communities with an incentive to conserve their forests.

Sustainable Management of Forests and Other Natural Resources

Sustainable management of forests and other natural resources projects include improving the management and sustainable use of forest stands and other ecosystems for timber and non-timber products (e.g., fiber, fruit or even tourism). Funding for this theme has increased by US$21.9 million, from US$77.9 million for the period 2009 - 2013 to US$99.8 million for the period 2015 - 2019.

With respect to funding by country, Peru has benefited the most (US$54.0 million, 54.1 percent), followed by Ecuador (US$26.4 million, 15 percent), Colombia (US$15.0 million, 15 percent) and Bolivia (US$4.2 million, 4.2 percent). See Table 11.16.

Table 11.16. Investment in Sustainable Management of Forests and other Natural Resources by Country in the Tropical Andes Hotspot, 2015 – 2019

Country	Total investment (US$ million)	Percentage
Argentina	0.0	0.0
Bolivia	4.2	4.2
Chile	0.0	0.0
Colombia	15.0	15.0
Ecuador	26.4	26.5
Peru	54.0	54.1
Venezuela	0.1	0.1
Total	99.8	100.0

By type of funding source (Table 11.17), national public sources invested US$42.1 million (42.2 percent) and international cooperation US$57.7 (57.8 percent).

Table 11.17 Investment in Sustainable Management of Forests and Other Natural Resources by Source in the Tropical Andes Hotspot, 2015 – 2019

Source	Total investment (US$ million)	Percentage
Bilateral	28.8	28.9
Foundations	2.3	2.3
Multilateral	26.5	26.6
Other donors	0.0	0.0
National public	42.1	42.2
Total	99.8	100.0

Among the national public investment projects, the "Recovered forest areas with adequate forest and wildlife management" project stands out, having invested more than US$9.4 million in the Peruvian hotspot between 2015 and 2019.[54]

[53] http://www.bosques.gob.pe/transferencias-directas-condicionadas
[54] This investment is coded with the number 3000384 according to the Ministry of Economy and Finance at: https://apps5.mineco.gob.pe/transparencia/Navegador/default.aspx.

Among the projects financed by bilateral sources in Peru, the following stand out: 1) the "Forest Conservation Program in the Amazonas, Lambayeque, Loreto, Piura, San Martín, Tumbes and Ucayali departments", financed by the Japan International Cooperation Agency (JICA), which, although it financed only part of the hotspot, it provided approximately US$4.0 million to sustainable management of Andean forests; and 2) the Belgian cooperation's "Integrated management of natural resources in the departments of Apurimac, Ayacucho and Huancavelica (PRODERN II)" project, which had an impact in all areas of the hotspot, leaving an estimated investment of US$4.8 million for this theme for the 2015 - 2019 period.[55] In Colombia, the "Deforestation-free supply chains through public-private partnerships and mobilization of Asian and U.S. markets" project (NORAD, US$1.7 million) sought to improve sustainable forest management through good practices in climate-smart agriculture.[56]

With respect to projects from multilateral sources, the "Additional Financing for the Colombian Sustainable Livestock Project" project financed by the World Bank, invested around US$4.2 in the Colombian hotspot between 2015 and 2019.

Community Development and Local Governance

According to Peru's National Forest and Climate Change Strategy[57] native community forests suffer less deforestation than those without this administrative structure, d emonstrating that good local governance of ecosystems is important to reduce the risk of biodiversity loss. Investment in this area compared to the previous period shows an increase of US$2.4 million compared to the 2009 - 2013 period, growing from US$35.4 to US$37.8 in this period.

By country, Ecuador (35.3 percent), Peru (29.6 percent) and Colombia (25.4 percent) received more or less similar investment. See Table 11.18.

Table 11.18. Investment in Community Development and Local Governance by Country in the Tropical Andes Hotspot, 2015 – 2019

Country	Total investment (US$ million)	Percentage
Argentina	0.0	0.0
Bolivia	3.4	9.1
Chile	0.0	0.0
Colombia	9.6	25.4
Ecuador	13.4	35.3
Peru	11.2	29.6
Venezuela	0.2	0.6
Total	37.8	100

By source, bilateral international cooperation stands out with 43.6 percent of the amount invested in this area (Table 11.19).

[55] https://prodern.minam.gob.pe/
[56] https://www.norad.no/en/front/funding/climate-and-forest-initiative-support-scheme/grants-2013-2015/projects/deforestation_free_supply_chains_through_public_private_partnerships_and_mobilising_asian_and_us_markets/
[57] http://www.bosques.gob.pe/archivo/ff3f54_ESTRATEGIACAMBIOCLIMATICO2016_ok.pdf

Table 11.19. Investment in Community Development and Local Governance by Source in the Tropical Andes Hotspot, 2015 – 2019

Source	Total investment (US$ million)	Percentage
Bilateral	16.5	43.6
Foundations	2.1	5.6
Multilateral	10.5	27.8
Other donors	0.7	1.7
National public	8.0	21.2
Total	37.8	100

Planning, Policy and Institutional Strengthening

Funds for planning, policy and institutional strengthening are included within projects that seek to improve the structure, functioning and sustainability of public institutions and the proper implementation of the rule of law and democracy in natural resource management in the hotspot. For the 2015 - 2019 period, investment in this area has been estimated at US$61.3 million. In comparison with the previous period (2009 - 2013) for which US$26.9 million was estimated. This US$34.4 million increase between the two periods could be an overestimation, since public information is more accessible today than six years ago and it was precisely the national public source that contributed the most information by far. In fact, for the previous profile, national sources represented only 20 percent of all investment, while for this profile they represent approximately 36.9 percent.

By country, Colombia (61.6 percent) and Peru (34.5 percent) accounted for the majority of funding in this area. By source, national governments contributed the most (67.6 percent), followed by bilateral sources (18.9 percent), multilateral sources (11.8 percent) and foundations (1.7 percent). In other words, the National governments have been investing in themselves to strengthen their institutions and develop their plans and policies, with support from international cooperation (Table 11.20 and Table 11.21).

Table 11.20. Investment in Planning, Policy and Institutional Strengthening by Country in the Tropical Andes Hotspot, 2015 - 2019

Country	Total investment (US$ million)	Percentage
Argentina	0.0	0.0
Bolivia	1.9	3.2
Chile	0.0	0.0
Colombia	37.8	61.6
Ecuador	0.4	0.7
Peru	21.1	34.5
Venezuela	0.0	0.0
Total	61.3	100.0

Table 11.21. Investment in Planning, Policy and Institutional Strengthening by Source in the Tropical Andes Hotspot, 2015 - 2019

Source	Total investment (US$ million)	Percentage
Bilateral	11.6	18.9
Foundations	1.0	1.7
Multilateral	7.3	11.8
Other donors	0.0	0.0
National public	41.5	67.6
Total	61.3	100.0

Within the category of international cooperation support, the "Contribution to Peru's Environmental Goals - Proambiente" project (in its phases I and II), financed by GIZ, stands out. Although it invested in strengthening national environmental and forestry management systems and improving cooperation between national and subnational institutions, it is estimated that it benefited natural resource management in the hotspot by around US$8.4 million between 2015 and 2019.

Watershed Conservation

Watershed conservation includes projects that seek to conserve natural resources or protect against environmental degradation (e.g., conserving water resources and soil, reducing erosion), as well as those that seek to restore damage from environmental liabilities caused by mining projects or infrastructure construction. Ecosystem restoration has been listed by the United Nations (UN) as a priority objective for the 2021 to 2030 decade[58].

For the current period (2015 - 2019), US$45.9 million has been invested in this area, US$18.7 million higher than for the previous period (2009 - 2013).

By country, Bolivia has benefited the most (US$15.0 million, 32.7 percent), followed by Colombia (US$14.9 million, 32.5 percent), Peru (US$12.0 million, 26.2 percent) and Ecuador (US$3.9 million, 8.5 percent). See Table 11.22.

Table 11.22. Investment in Watershed Conservation by Country in the Tropical Andes Hotspot, 2015 – 2019

Country	Total investment (US$ million)	Percentage
Argentina	0.0	0.0
Bolivia	15.0	32.7
Chile	0.0	0.0
Colombia	14.9	32.5
Ecuador	3.9	8.5
Peru	12.0	26.2
Venezuela	0.0	0.1
Total	45.9	100.0

[58] https://www.unenvironment.org/es/noticias-y-reportajes/comunicado-de-prensa/nueva-decada-de-la-onu-para-la-restauracion-de-los

By source (Table 11.23), national public public investments stand out (35.5 percent), followed by support from multilateral (28.8 percent) and bilateral (28.4 percent) sources and foundations (7.4 percent).

Table 11.23 Investment in Watershed Conservation by Source in the Tropical Andes Hotspot, 2015 – 2019

Source	Total investment (US$ million)	Percentage
Bilateral	13.0	28.4
Foundations	3.4	7.4
Multilateral	13.2	28.8
Other donors	0.0	0.0
National public	16.3	35.5
Total	45.9	100.0

Important projects include: 1) "Natural Infrastructure for Water Security" (USAID, US$2.9 million in Peru); 2) "Support for Integrated Water Resource Management (IWRM) in Colombia" (IDB, US$3.7 million in Colombia); 3) "Sustainable Management and Conservation of Biodiversity in the Magdalena River Basin" (GEF, US$4.6 million in Colombia); 4) "Integrated Management of Water and Natural Resources" (European Union, US$4.5 million for this issue in Bolivia[59]); 5) "Integrated Rural Development in Watersheds (PROCUENCA)" (GIZ, US$5.6 million in Bolivia); 6) "Climate Change Resilience and Integrated Watershed Management Project in Bolivia" (World Bank, US$4.1 million in Bolivia); and 7) "Integrated Environmental Management in the Puyango River Basin" (of national funding, US$2.3 million in Bolivia).

Capacity Building

For this calculation, only projects with an explicit objective of capacity building were taken into account, without considering many other projects that have some component or specific actions for capacity building but have a primary focus or main objectives on other issues. For this reason, investment in this area could be an underestimation.

According to the methodology used, capacity building was the least funded thematic area in this period (2015 - 2019), with an estimated US$4.7 million, having reduced investment by US$2.5 million compared to the 2009 -2013 period, where it was also the thematic area with the lowest investment.

By country, Peru benefited the most, with 80.1 percent of the total invested, and by source, more than two-thirds of the financing in this area came from national public funds (Tables 11.24 and 11.25).

[59] This project, with a total budget of approximately US$61 million, financed around US$13.5 million in the hotspot for the 2015 to 2019 period. Of this US$13.5 million, an estimated US$4.5 million was earmarked for watershed conservation in specific watersheds.

Table 11.24. Investment in Capacity Building by Country in the Tropical Andes Hotspot, 2015 – 2019

Country	Total investment (US$ million)	Percentage
Argentina	0.0	0.0
Bolivia	0.1	1.5
Chile	0.0	0.0
Colombia	0.3	6.6
Ecuador	0.4	9.2
Peru	3.7	80.1
Venezuela	0.1	2.6
Total	4.7	100

Table 11.25. Investment in Capacity Building by Source in the Tropical Andes Hotspot, 2015 – 2019

Source	Total investment (US$ million)	Percentage
Bilateral	0.7	14.2
Foundations	0.1	1.5
Multilateral	0.8	18.2
Other donors	0.0	0.0
National public	3.1	66.1
Total	4.7	100

Some of the most important projects were: 1) "Strengthening of capacities in the conservation, management and sustainable use of the vicuña (*Vicugna vicugna*) in the rural communities of the Junín region", with national public funding from Peru, US$1.0 million, and 2) "Capacity Building Project for Forest Conservation and REDD+ Mechanisms", funded by JICA in Peru with US$0.5 million.

Following these, CEPF funding provided close to US$300,000 distributed across six projects exclusively focused on capacity building, most notably "Strengthening conservation practices and network learning with social and community actors of the Paraguas-Munchique and Cotacachi-Awá Corridors" and "Formulation of protective measures and strategies for environmental leaders and organizations at risk in the Tropical Andes Hotspot". In addition, 80 percent of CEPF projects have capacity building objectives that are represented in other categories in this chapter.

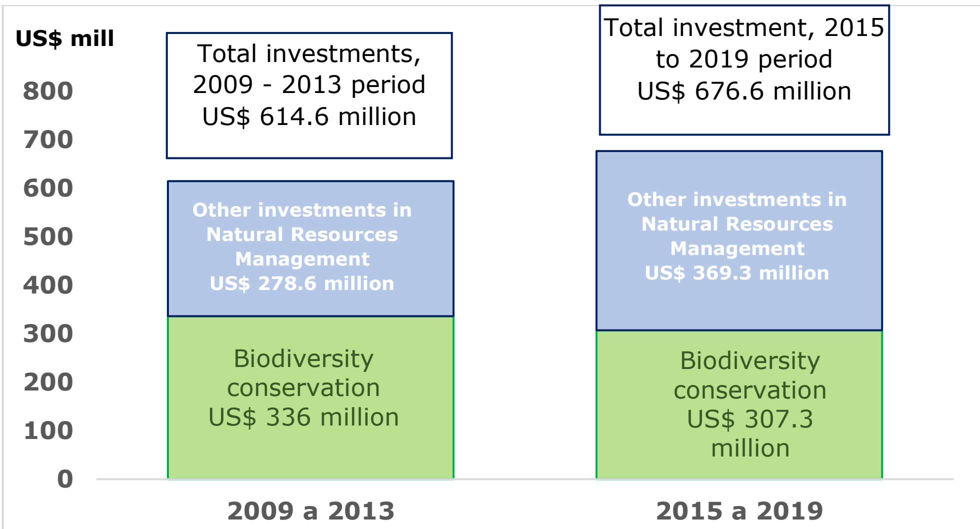
Overall, forty projects were financed in this area. Excluding the eight projects with the most funding, the average investment per project (for the remaining 32) was very low, around US$24,500 per project.

11.2.3 Comparison of Investments by Theme with Respect to the Previous Profile

As explained at the beginning of the chapter, this comparison is for guidance purposes, as there may be differences in the availability of information and slight changes in the methodologies used between the periods 2009 - 2013 and 2015 - 2019.

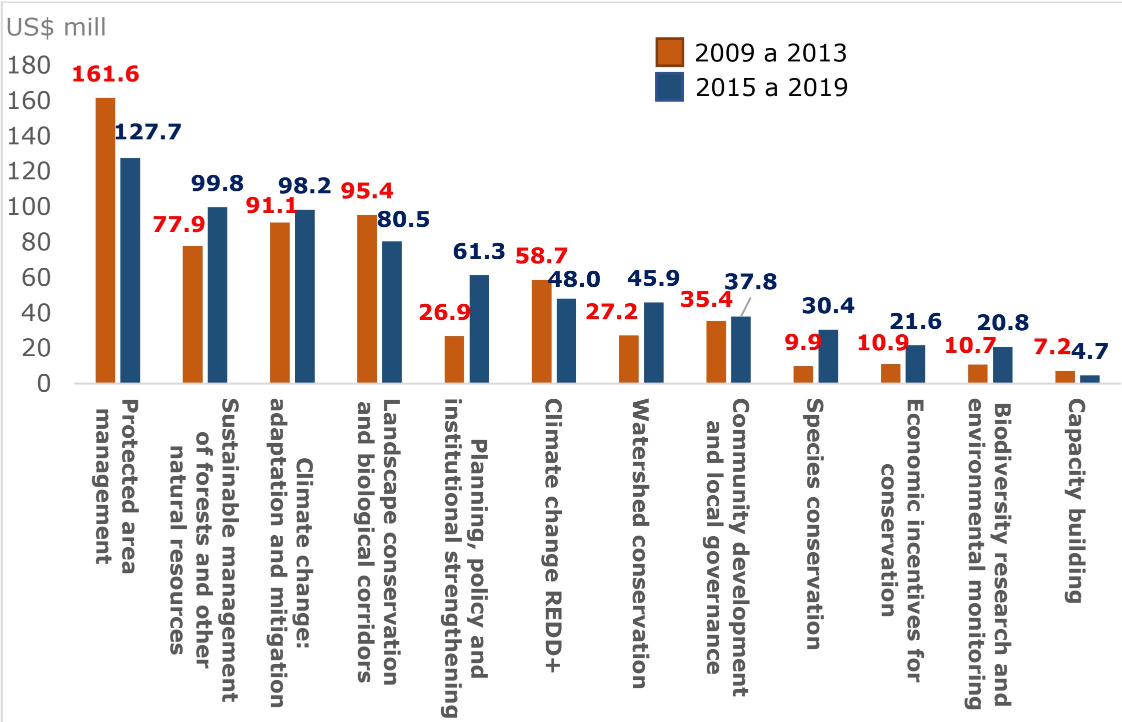
With that in mind, some differences in investment between the previous period (2009 - 2013) and the current period (2015 - 2019) are presented. The most important one is that, although total investment in natural resource management has increased by US$62 million, investment for biodiversity conservation has decreased by US$28.7 million. See Figures 11.6 and 11.7.

Figure 11.6. Comparison in Natural Resource Management and Biodiversity Conservation Investment between the periods 2009 - 2013 and 2015 – 2019



Although there are no major differences in general, funding for protected area management, landscape and biological corridor conservation and REDD+, which were the most funded conservation areas in the previous period, have been reduced.

Figure 11.7 Comparison in Natural Resource Management Investment between the periods 2009 - 2013 and 2015 - 2019 by Theme



11.3 Investments in Civil Society

The hotspot CSOs had very limited access to conservation funding. The total funding received by CSOs this period (US$100.7 million) has more than doubled compared to the previous period (US$45.0 million). However, much of this funding was expended by a few large, international CSOs (42.7 percent for 102 projects).[60] National CSOs executed the majority of projects, but with a much smaller amount per project (57.2 percent but for 584 projects). See Table 11.26.

Table 11.26. Investments Executed by CSOs and Difference Between the 2009 - 2013 and 2015 - 2019 Periods

Type of CSO	Millions of US$ (2015 - 2019)	Millions of US$ (2009 - 2013)	Difference, Millions of US$	No. of projects (2015 a 2019)	US$ average per project (2015 a 2019)
All CSOs	100.7	45.0	55.66	686	146,738
International CSOs	43.0	N/A	N/A	102	422,027
National CSOs	57.6	N/A	N/A	584	98,656

[60] As the most important in estimated execution in the hotspot for the period 2015 to 2019, WCS would have executed more than US$11.1 million in 25 projects, followed by ACCA (US$6.7 million, 10 projects), Conservation International (US$6.4 million, 7 projects) and WWF (US$5.2 million, 13 projects).

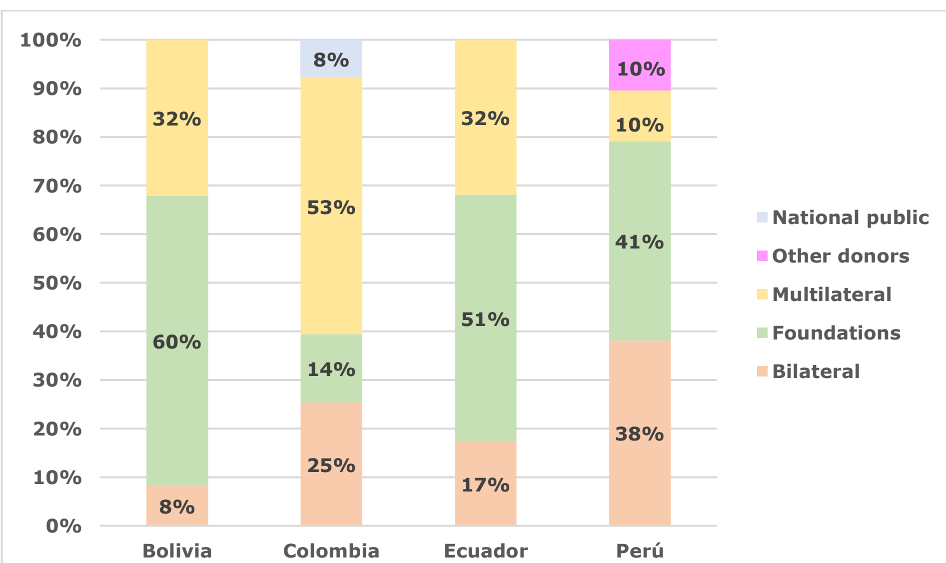
By country, Peruvian CSOs expended the most, (US$38.6 million), followed by CSOs in Colombia (US$25.2 million) and Ecuador (US$21.6 million). The ecosystem profile was not able to identify any funding for CSOs in Argentina or Chile and in the case of Argentina, minimal financing was identified.

Table 11.27. CSO Executed Investment in the Tropical Andes Hotspot by Country, 2015 – 2019

Country	Total investment (US$ million)	Percentage
Argentina	0.03	0.0
Bolivia	12.2	12.0
Chile	0.0	0.0
Colombia	25.7	25.5
Ecuador	21.9	21.7
Peru	39.1	39.0
Venezuela	1.6	1.6
Total	100.7	100.0

By source, project funding for CSOs for all countries in the hotspot came almost exclusively from international cooperation (97.9 percent), while only 2.1 percent was funded by national governments. Thus, CSOs of Colombia, Ecuador, Perú and Bolivia have received funding for capacity building through foundations (US$38.1 million, 37.8 percent), followed by multilateral (US$28.5 million, 28.3 percent) and bilateral sources (US$26.3 million, 26.11 percent). In the case of Peru, US$3.5 million was financed through the Walt Disney Company's support to Conservation International for the execution of the "Alto Mayo Protected Forest REDD+" project (listed in Figure 11.8 below as "other donors").

Figure 11.8. CSO Investment Ratio in the Tropical Andes Hotspot, by Source and Country, 2015 – 2019



The foundation that has financed the most projects for CSOs in the hotspot was been the Moore Foundation (US$16.9 million), with projects aimed at protected area management, landscape and biological corridor conservation, and watershed conservation, among others. It is followed by The Rainforest Trust (US$10.7 million), with almost a 100 percent focus on species conservation and the establishment of protected areas. Then comes The Andes Amazon Fund, which financed US$4.4 million in projects aimed at establishing and managing protected areas and the John D. and Catherine T. MacArthur Foundation, which provided US$4.2 million for watershed, landscape and biological corridor conservation, as well as community development, local governance and biodiversity research.

Table 11.28. Major Donor Foundations for CSOs in the Tropical Andes Hotspot, 2015 – 2019

Foundation	Amount US$ million 2015 - 2019
Moore Foundation	16.9
Rainforest Trust	10.7
Andes Amazon Fund	4.4
John D. and Catherine T. MacArthur Foundation	4.2
Tinker Foundation	1.0
Others	0.92

Regarding multilateral donors' investments for CSOs in the hotspot for the 2015 - 2019 period, the main donor was the GEF Small Grants Program (SGP) which financed US$9.7 million in 337 projects. However, its contribution was been distributed across a large number of projects with an average of US$30,000 per project. The executing CSOs were mainly small local organizations. These organizations are the backbone of the territory because of their close relationships with local communities and their knowledge of the territory and its associated problems, which is why this program is so important. In addition, their wide distribution throughout the hotspot area ensures an equitable distribution of resources.

After SGP, the multilateral donor that contributed the most funds to CSOs was CEPF, which invested an estimated US$7.5 million in the 2015 - 2019 period. The amount would rise to US$9.5 million if the period under consideration were extended to 2020. More than 75 percent of CEPF funds was spent by national and local CSOs, strengthening territory structure and governance capacities of rural communities due to the close connection between implementing CSOs and local populations. CEPF's themes were varied and included the conservation of endangered species, community development and local governance, management of protected areas and KBAs and landscape and biological corridor conservation, among others. More information on CEPF's investment in the hotspot can be found in Chapter 3.

After CEPF, the World Bank financed US$6.0 million in the "Sustainable Colombian Livestock Project" (US$4.2 million), which was executed by the Colombian Federation of Cattle Ranchers (FEDEGÁN by its acronym in Spanish), among others, and sought to improve the production of the cattle business through environmentally friendly work, with the use of different types of trees integrated into livestock production (silvopasture systems), and the conservation of native forests on the farms.

Table 11.29 Major Multilateral Donors for CSOs in the Tropical Andes Hotspot, 2015 – 2019

Multilateral donor	Amount US$ million 2015 - 2019
GEF small grants	9.7
CEPF	7.5
World Bank	6.0
GEF	4.2
Others	1.9

Bilateral donors invested US$27.3 million, which was channeled mainly through large international CSOs.

USAID (US$9.2 million) sought to improve the conditions for access and sustainable use of biodiversity resources and their accessibility to markets, promoting a bioeconomy with a focus on conservation and proper local governance. Its projects were often implemented through large CSOs.

NORAD financed US$6.2 million in projects focused on community development and deforestation reduction. Its implementing partners were often indigenous organizations and federations or their associated CSOs.

The European Union financed US$4.0 million focused on climate change.

The U.S. Fish and Wildlife Service (USFWS) funded US$3.9 million in projects generally oriented towards species conservation. Its partners were both international and national CSOs, with greater emphasis on the latter.

Finally, AFD (France) financed US$2.7 million in projects that focused on community development and local governance. The investment was channeled through French-based organizations.

Table 11.30 Major Bilateral Donors to CSOs in the Tropical Andes Hotspot, 2015 – 2019

Bilateral donor	Amount US$ million 2015 - 2019
USAID	9.2
NORAD	6.2
European Union	4.0
USFWS	3.9
AFD	2.7
Others	1.3

11.4 Strategic Funding Mechanisms

Numerous strategies have emerged as important environmental funding mechanisms in the hotspot in recent decades, including Conservation Trust Funds (CTFs) and water funds.[61]

Conservation Trust Funds (CTF)

CTFs are legally independent, private and mixed donor institutions that provide grants 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, as well as other financing mechanisms such as taxes. CTFs are considered important because they offer stable funding flows that are largely independent of changes in government authorities and regimes.

Bolivia's CTF is the *Fundación para el Desarrollo del Sistema Nacional de Áreas Protegidas De Bolivia* (FUNDESNAP). It channeled about US$2.3 million mainly through four projects in the hotspot for the 2015 - 2019 period. FUNDESNAP seeks to contribute to the strengthening and sustainability of biodiversity conservation processes and support the National System of Protected Areas. The projects focused on the regional implementation team (RIT) in the Tropical Andes, financing for Bolivia's protected areas, promotion of sustainable, productive innovations and territorial development in communities. FUNDESNAP's projects were supported by the Moore Foundation, CEPF, the World Bank and DANIDA, among others. The European Union supported SERNAP with protected area management in Bolivia until 2014.

Colombia's two CTFs are *Fondo Patrimonio Natural* and *Fondo para la Acción Ambiental y la Niñez*. *Fondo Patrimonio Natural* expended US$8.3 million on 27 projects in the hotspot for the 2015 - 2019 period, a lower amount than during the previous period (2009 - 2013) when it disbursed US$14.3 million. *Fondo Patrimonio Natural* seeks to promote strategic investments to conserve the country's natural areas and ecosystem services. Some of *Fondo Patrimonio's* donors are multilateral sources such as GEF, CEPF and IDB, international NGO such as TNC, Moore and Andes Amazon Fund, and the Colombian government. While *Fondo para la Acción Ambiental y la Niñez* (*Fondo Acción*) disbursed US$2.36 million across 89 projects in the 2015 - 2019 period, this figure was also lower than the previous period, when it disbursed US$8.4 million. *Fondo Acción's* goal is to protect and promote the sustainable use of biodiversity by supporting sustainable production.

The *Fondo de Inversión Ambiental Sostenible* (FIAS by its acronym in Spanish) replaced Ecuador's National Environmental Fund in 2017. Between the two, an estimated US$9.8 million was channeled to conservation between 2015 and 2019. FIAS, in turn, manages several funds, of which *Fondo de Áreas Protegidas* (FAP by its acronym in Spanish) and the Socio Bosque Fund (which finances the Socio Bosque Program) have particular relevance to the hotspot. The FAP was created in 2002 to support Ecuador's National System of Protected Areas (SNAP by its acronym in Spanish). The FAP covers the basic operating expenses of the protected areas and contributes to the self-sustainable development of the communities. The Socio Bosque Fund supports the Socio Bosque program, which was founded with the help of CEPF, with the

[61] Conservation Trust Funds and water funds were not included as sources or donors in the total conservation investment figures reported above, as they are often a vehicle for the disbursement of funds from existing funding sources identified in the previous sections, i.e., they are recipients or conduits of funds from international cooperation and national governments.

administration of resources provided by international cooperation, mainly KfW, for the payment of economic incentives to farmers and indigenous communities that voluntarily commit to the conservation and protection of their native forests, páramos or other native vegetation.

In Peru, the *Fondo de Promoción de las Áreas Naturales Protegidas del Perú* (PROFONANPE) seeks the proper management of Natural Protected Areas (NPAs), strategic and operational planning, and to support the civil society in these areas. It channeled about US$4.8 million into the hotspot (2015 - 2019), a lower amount than during the previous period, when it channeled an estimated US$16.7 million. PROFONANPE's main donors have been GEF, the Moore Foundation and CEPF, but above all KfW, which provided the CTF with more than US$3.6 million for its "Effective Management of Natural Protected Areas" project. The project resources were used to strengthen the management of SERNANP and the management model of selected NPAs for the achievement of effective and sustainable objectives defined in the Guiding Plan and Master Plans and for consistency with the Strategic Plan for Biological Diversity goals. Finally, the Fondo de las Américas (FONDAM), which closed its funding during this period (2015 - 2019), financed only an estimated US$750,000 for the hotspot, which corresponded to the closure of projects pending completion.

Table 11.31. Active Conservation Trust Funds in the Tropical Andes Hotspot, 2015 – 2019

Country	**Name of Conservation Trust Fund**	**Objectives**	**Hotspot investment US$ millions**
Bolivia	FUNDESNAP	Contribute to the strengthening and sustainability of the conservation processes of the country's broad biodiversity, as an environmental fund specialized in supporting the National System of Protected Areas at the national and sub-national levels.	2.3
Colombia	Fondo Patrimonio Natural	Promote strategic investments in and with companies, government and society for the conservation of the country's natural areas and the services provided by ecosystems, while contributing to the improvement of the quality of life and capacity building of local communities.	8.3
	Fondo para la Acción Ambiental y la Niñez (Fondo Acción)	Protection and sustainable use of biodiversity by supporting sustainable production systems.	2.36

Ecuador	Fondo de Inversión Ambiental Sostenible (FIAS) /1	Protection, conservation and improvement of natural resources and the environment, management of protected areas, control of invasive species and work with Amazonian communities, among others.	9.8
Peru	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.	4.8

Note: Approximate contributions to the hotspot from the *Fondo de Áreas Protegidas* (FAP) and *Socio Bosque* Fund have been taken into account.

Water Funds

Certain conservation organizations have designated water as a target to promote the conservation of natural landscapes in the region, generating commitments from stakeholders that are not necessarily motivated by emblematic species or ecosystems. Using trust funds as a financial vehicle to channel resources from water users leverages investment for conservation action for natural areas and landscapes important for water supply.

Water funds channel conservation resources towards local stakeholders and beneficiaries that are interested in securing water supply and quality. Water users make payments to a fund that, in turn, pays for watershed conservation that protects the water supply. Watersheds can be protected in a variety of ways, such as preventing forest disturbance, protecting riparian systems or reforesting degraded lands in the watershed. Some water funds, such as that of the Cauca Valley in Colombia, involve partnerships between private companies, environmental authorities, NGOs, grassroots groups and local governments. Because most KBAs are located in watersheds that supply water to communities, industries, hydropower plants and/or agriculture, there is significant potential for water funds to contribute to the protection of KBAs. While there are several notable successes in the region, there is a tremendous need and potential for scaling up and replication in this area.

The hotspot has 16 active water funds, which generated about US$73 million in the 2015 - 2019 period. Table 11.32 also shows the KBAs or corridors that benefit from these funds.

In addition, in Bolivia, *Fundación Natura* Bolivia has implemented the "*Acuerdos Recíprocos por Agua*" (ARAs or Reciprocal Water Agreements)[62], which are conservation schemes based on incentives given to farmers in the upper watersheds to get them involved in the conservation of forests associated with water sources. CEPF financed the creation of ARAs in its Phase II investment in Bolivia. Unlike the conceptually similar "payments for environmental services", the key attributes of ARAs are the precautionary principle and local institution building and alignment.

[62] https://www.naturabolivia.org/es/acuerdos-reciprocos-por-agua/

Table 11.32. Active Water Funds in the Tropical Andes Hotspot

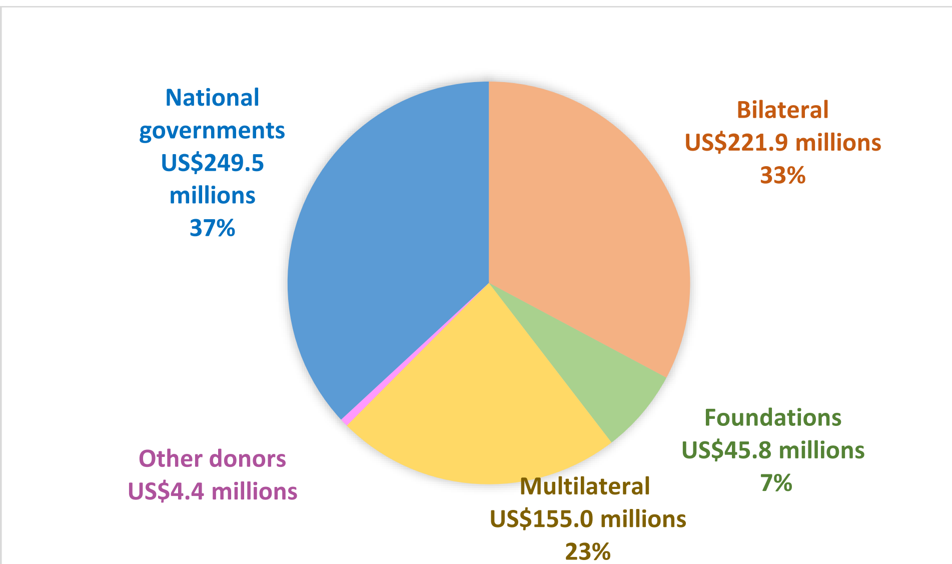
Country	City or Region	Name of Water Fund	KBAs/Corridors	Leveraged resources US$
Bolivia	Santa Cruz de la Sierra	FONACRUZ	Parque Nacional Amboró	NA
Colombia	Santa Marta	Fondo de Agua de Santa Marta y Ciénaga	Parque Nacional Natural Sierra Nevada de Santa Marta y alrededores	322,996
	Cartagena	Fondo de Agua de Cartagena	None	312,180
	Cúcuta	El Fondo de Agua de Norte de Santander	None	430
	Medellín	Cuenca Verde	None	8,200,000
	Bogotá	Agua Somos	Parque Nacional Natural Chingaza y alrededores, Parque Nacional Natural Sumapaz	9,100,000
	Cali	Madre Agua	Parque Nacional Natural Farallones de Cali	NA
	Cauca Valley	Fondo de Agua por la vida y la sostenibilidad	Parque Nacional Natural Farallones de Cali	15,900,000
Ecuador	Quito	Fondo para la Protección del Agua (FONAG)	Cordillera Nororiental in Ecuador	22,500,000
	Provinces of Azuay and Cañar	Fondo del Agua para la conservación de la cuenca del río Paute (FONAPA)	Parque Nacional Sangay, Bosque Protector Dudas-Mazar	NA
	Tungurahua	Fondo de Páramos Tungurahua	None	3,500,000
	Guayaquil	Fondo para la Conservación del Agua de Guayaquil	None	US$145,000 per year from private partners and US$2.5 million from the World Bank for the implementation of an Automatic Water Quality Network (SAICA Network).
	Loja, Zamora and Carchi Provinces	FORAGUA	Corredor de bosques secos Tumbes-Loja, Parque Nacional Podocarpus, corredor Awá-Cotacachi-Cotopaxi	US$6,000,000 from 2011 to 2019
	Fonapa	Fondo del Agua para la conservación de la cuenca del río Paute (FONAPA)	Corredor del occidente en Azuay, Parque Nacional Sangay, Bosque	5,000,000

			Protector Dudas-Mazar	
Peru	Lima	Aquafondo	Fondo de Agua para Lima y Callao (Aquafondo)	3,400,000
	Piura	Fondo Regional del Agua (FORASAN)	None	52,000

11.5 Sources of Investment

More than 20 bilateral sources, 14 multilateral sources, 15 foundations and other donors were reviewed. Among the national governments' investment, funding at the national, regional, and local levels and from other public bodies was reviewed. According to this methodology, public investment funding predominated in the 2015 - 2019 period, followed by bilateral donors, multilateral and foundations (Figure 11.9).

Figure 11.9. Amount Spent in the Tropical Andes Hotspot according to Financial Source, 2015 – 2019

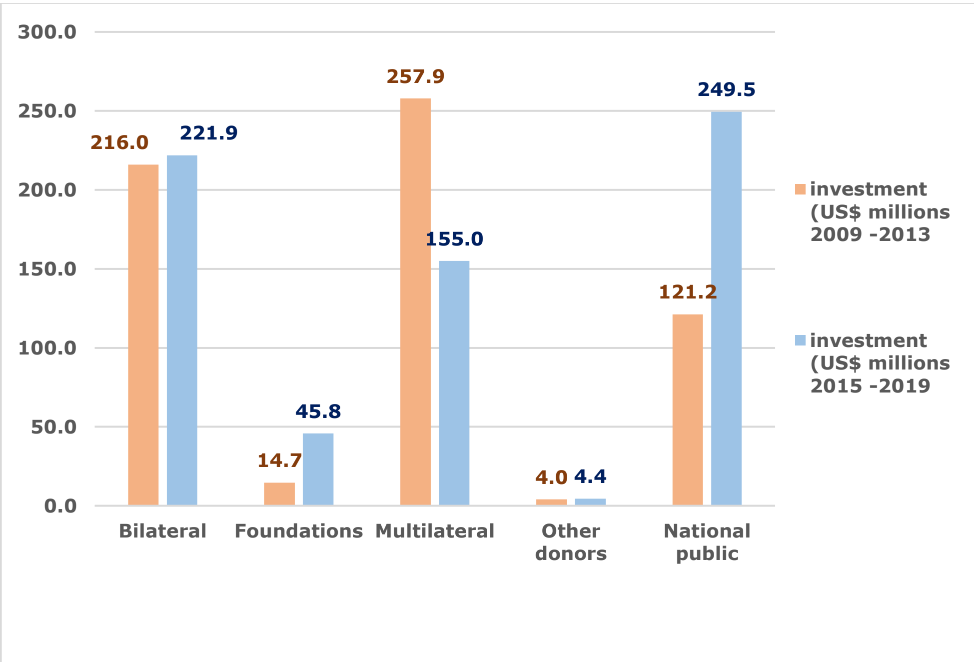


The comparison of investment by source with respect to the previous period is also subject to improvements in the access to public financing information in the last five years, which could overestimate the difference between the two periods.

When comparing this 2015 - 2019 period with the previous one (2009 - 2013), there is a decrease of US$65.5 million in international cooperation investment, which generally finances thematic areas directly linked to biodiversity conservation. On the other hand, funding from national public sources increased by US$128.3 million, which generally finance themes related to natural resource management. This explains why, even though total investment has increased by US$62.8 million over the previous period, funding for biodiversity conservation has decreased by US$28 million, from US$336 million (2009 - 2013) to US$307.3 million (2015 - 2019). Figure 11.10 shows this variation by source.

As discussed above, the observed increase in public funding may be misleading, given the region-wide economic contraction since the end of 2017 and the reduced fiscal budgets in all hotspot countries. It is unlikely that national governments have doubled investment in natural resource management. Therefore, this difference is best explained by the substantial improvement in transparency and access to information in the national governments, which has strongly influenced the differences observed in Figure 11.10.

Figure 11.10 Variation of the Amount (in US$ million) Financed by Source in the Tropical Andes Hotspot, 2009 - 2013 and 2015 – 2019



The following is a description of what the investment in natural resources management in the hotspot meant for each source.

Multilateral Sources

Multilateral sources funded US$155.0 million for the 2015 - 2019 period in the hotspot, US$102.9 million less than for the 2009 - 2013 period. The most funded themes were: sustainable management of forests and other natural resources (US$26.5 million, 17.1 percent), landscape and biological corridor conservation (US$24.5 million, 15.8 percent), climate change adaptation and mitigation (US$24.0 million, 15.5 percent), and protected area management (US$19.5 million, 12.6 percent). The most significant donors in order of importance based on the amount invested were: GEF, World Bank, IDB, Green Climate Fund, CEPF, UNDP, NDF, FAO, UNEP, UN-REDD and ITTO.

GEF was the largest multilateral donor in the hotspot, funding US$78 million in the 2015 - 2019 period. GEF projects are typically large and often include co-financing from other multilateral sources, bilateral, foundations and national governments. GEF generally funds national agencies and large international organizations, including the environment ministries of hotspot countries or agencies that manage protected areas. Thus, GEF has supported the management of protected area systems in Peru, Colombia and Ecuador in particular, through the following projects: "Securing the Future of Peru's Natural Protected Areas" (Peru, US$1 million), "Consolidation of the National System of Protected Areas at the National and Regional Level" (Colombia, US$0.6 million), "Sustainable Financing of Ecuador's National System of Protected Areas (SNAP) and Associated Private and Community PA Subsystems" (Ecuador, US$1.4 million). GEF also supports other areas such as landscape and biological corridors conservation and the management of forests and other natural resources, among others. GEF's projects include "Sustainable Productive Landscapes in the Peruvian Amazon" (Peru, US$5.8 million), "Multiplying Environmental and Carbon Benefits in High Andean Ecosystems" (Ecuador and Peru, US$3.8 million) and "Biodiversity Protection in the Amboró-Madidi Corridor" (Bolivia, US$2.8 million).

The World Bank provided US$20.2 million over the study period. The World Bank financed nine projects, but the average investment amount was quite high (US$2.2 million). The World Bank projects are also aimed at large national agencies or ministries; however, it financed the "Sustainable Livestock Project" and its extension "Additional Financing for the Sustainable Colombian Livestock Project" (Colombia, US$5.2 million), which was executed by the *Federación Colombiana de Ganaderos* (FEDEGÁN). The themes prioritized by the World Bank are climate change adaptation and mitigation, sustainable management of forests and other natural resources, and watershed conservation. Among the significant projects were the "Climate Change Resilience and Integrated Watershed Management Project in Bolivia" (US$8.3 million) and the "Low Carbon Sustainable Development Project in the Orinoquia Region" (Colombia, US$3.0 million), although the latter had only a partial influence on the hotspot.

The IDB financed 16 projects to the tune of US$11.9 million in the 2015 - 2019 period. The IDB finances projects that are generally executed by government agencies or partners. Its priorities have been climate change (both adaptation and mitigation and REDD+) and watershed conservation. Some important projects were "Support for integrated water resources management (IWRM) in Colombia" (US$3.7 million) and "Adaptation to climate impacts on water regulation and supply for the Chingaza-Sumapaz-Guerrero area" (Colombia, US$3.5 million). In addition, IDB financed the "Forest Investment Projects (FIP)", which, even though they influenced only part of the hotspot, were estimated to have channeled at least US$0.9 million in 2019.

The GEF Small Grants Program (SGP) disbursed about US$9.7 million in the 2015 - 2019 period in the hotspot. The SGP is particularly important as it finances a large number of projects (336 or 27 percent of all projects analyzed in this document) with small amounts (US$30,000 on average) that are implemented by national CSOs. GEF/SGP recipients are generally small organizations that are integrated in the territory and rural communities. This is why SGP improves territorial resilience through the improvement of local governance, sustainable management of forests and other natural resources and community development, encouraging economic, social and environmental sustainability.

The GCF is a climate fund that receives contributions from countries in order to comply with the 2015 Paris agreement. The GCF finances large projects that are implemented by government agencies or international CSOs, which must first be accredited to be eligible for funding. This accreditation process is not accessible to small national CSOs. For the current period, the project "Financial and land use planning instruments to reduce emissions from deforestation" (Ecuador, US$9.4 million) stands out.

CEPF funded an estimated US$7.5 million for the period 2015 - 2019, which increased to US$9.5 million for the period 2015 - 2020. Of the 65 CSOs that received CEPF funds, 55 grantees are Andean-based groups, and 10 are international NGOs. CEPF funded 100 projects, averaging US$95,000 per project. CEPF's priorities included KBA management, protected areas creation, species conservation, research, community development and local governance, landscape and biological corridor conservation, capacity building, among other topics.[63]

UNDP financed projects worth US$5.1 million in the period 2015 - 2019 in the hotspot. Projects with a medium-high investment (over US$300,000) are implemented through government agencies or environment ministries with support from UNDP country offices in the hotspot countries. However, smaller investments, between US$30,000 and US$300,000, can be executed by CSOs. UNDP focuses on climate change, community development and protected area management. Support to the NDC in Ecuador was funded with US$2.1 million by UNDP.

The Nordic Development Fund (NDF)[64] financed projects valued at more than US$4.5 million. The NDF focused almost exclusively on supporting Bolivian public institutions in climate change adaptation and mitigation. An important project was the "Pilot adaptation action plan for high inter-valley communities" (Bolivia, US$2.1 million).

The FAO, funded US$3.8 million in the hotspot (2015 - 2019). It channels its investments through national governments and focuses on climate change and management of forests and other natural resources. A relevant project was "Promotion of climate-smart livestock management integrating land degradation reversal and desertification risk reduction in vulnerable provinces" (Ecuador, US$2.9 million).

Other funds invested in the hotspot in the 2015 – 2019 period came from:

- UNEP (US$2.4 million), focused on climate change and planning, policy and institutional strengthening of national public institutions;
- the UN-REDD program (US$2.0 million), focused exclusively on climate change (channeling its investments through government ministries); and
- ITTO (US$163,000), executed by various CSOs under public entity supervision.

[63] More information on the CEPF information in the hotspot can be found in Chapter 3.
[64] https://www.ndf.fi/

Table 11.33. Summary of Major Multilateral Donors in the Tropical Andes Hotspot, 2015 – 2019

Donor	Main areas of intervention	Number of projects	Amount (US$ million) 2015 - 2019	Average per intervention (US$ million / project)
GEF	Support for protected area systems, landscape and biological corridor conservation and management of forests and other natural resources, among others.	44	78.0	1.8
World Bank	Climate change adaptation and mitigation, sustainable management of forests and other natural resources and watershed conservation.	9	20.2	2.2
IDB	Climate change (adaptation, mitigation and REDD+) and watershed conservation.	15	11.9	0.8
GEF small grants	Enhancing resilience of the territories by improving local governance through the sustainable management of forests and other natural resources and community development, encouraging economic, social and environmental sustainability in the territories.	336	9.7	0.03
Green Climate Fund	Climate change, adaptation, mitigation and REDD+.	2	9.5	4.7
CEPF	Territorial structuring and improvement of local governance, biodiversity research and monitoring, species conservation, management of protected areas and KBAs and conservation of biological corridors.	95	7.5	0.08
UNDP	Climate change, community development and protected area management.	22	5.1	0.2
Nordic Development Fund (NDF)	Climate change: adaptation and mitigation.	5	3.9	0.8
FAO	Climate change, management of forests and other natural resources, improving living conditions, reducing hunger and improving agriculture and soils.	4	3.8	1.0

Others UNEP, UN-REDD, ITTO	Various.	NA	5.4	NA

Bilateral Sources

Bilateral sources financed US$221.9 million for the 2015 - 2019 period in the hotspot, US$5.9 million more than for the 2009 - 2013 period.[65] The most funded themes by this type of donor were: climate change adaptation and mitigation (US$57.2 million, 25.8 percent), protected area management (US$35.5 million, 16.0 percent), sustainable management of forests and other natural resources (US$28.8 million, 13.0 percent) and climate change REDD+ (US$26.8 million, 12.1 percent).

German cooperation was the most important bilateral source in terms of resources invested. Between the KfW, GIZ, and the BMU, provided more than US$88.3 million in financing. The KfW financed 13 projects for a total of US$45.0 million, with most of the funding directed to supporting protected area systems in the hotspot countries. Thus, KfW's donation[66] for the efficient management of the protected areas of the hotspot in the 2015 - 2019 period is estimated at US$14.1 million and there is also an agreement for the extension of its donation beyond 2020.[67] In Colombia, the "Biodiversity and Protected Areas" Program provided an estimated US$4.5 million for the same purpose. In Ecuador, the "Management of Biosphere Reserves and Protected Areas" project was funded with US$1.5 million. KfW also financed other projects in Ecuador: the "Forest Conservation and REDD+ Program" (US$12.3 million) and the "*Proyecto Socio Bosque de Conservación*" (US$0.8 million), a system of economic incentives for the protection of forests, páramos and native vegetation benefiting indigenous and local farmer communities throughout the country. KfW's implementation partners include national entities, state public institutions and communities.

Regarding other German cooperation institutions, GIZ financed around US$30.5 million focusing on climate change, institutional strengthening, watershed conservation and economic incentives for conservation. Some of the most significant investments were: "*Programa Contribución a las metas ambientales - Proambiente* (fases I and II)" (Peru, US$8.4 million) and "*Desarrollo rural integrado en cuencas hidrográficas* (PROCUENCA)" (Bolivia, US$11.2 million). The BMU financed approximately US$8.1 million in projects, with preference given to climate change and sustainable forest management. The BMU invested an estimated US$1.6 million in the implementation of the NDCs in Ecuador, together with cooperation from other countries. Finally, the IKI climate fund[68] channeled additional BMU resources of about US$4.7 million for climate change projects and economic incentives for conservation. As with KfW, the implementing partners of these donors are national governments or public institutions.

United States of America (US) cooperation was second among bilateral sources in terms of amount invested. USAID and the USFWS invested US$40.9 million in 70 projects. With respect to other US cooperation agencies profiled in the previous period: the US Department of State (USDoS) did not finance natural resource management projects in the hotspot area, and

[65] In the last profile the European Union was considered as a multilateral donor
[66] Donation to the Peruvian government and PROFONANPE.
[67] https://www.gob.pe/institucion/mef/noticias/321977-mef-y-banco-de-desarrollo-aleman-kfw-firman-acuerdo-por-20-millones-de-euros-para-conservacion-de-12-areas-naturales-protegidas
[68] Internationale Klimaschutzinitiative (IKI) (https://www.international-climate-initiative.com/de/)

information on US Forest Service (USFS) projects could not be accessed, but it is known to have channeled USAID funds, mostly in the Amazon, for the 2015 -2019 period.[69] . Finally, the Inter-American Foundation (IAF) invested about US$100,000 in the hotspot in the 2015 - 2019 period.

USAID provided an estimated US$36.9 million in funding for the 2015 - 2019 period. This sum is US$92 million less than in the 2009 -2013 period because: 1) the aid focused more on the Amazonian lowlands and less on the Andean mountain range and 2) it was not then funding in Bolivia and it reduced its allocation for Ecuador due to disagreements with the government there. USAID has, therefore, focused on the Amazon or the Colombian Orinoco region and a large proportion of funds went gone to coca eradication, and supporting public institutions in Peru and Colombia. These projects have not been considered in this chapter because they are not directly related to biodiversity conservation. In the hotspot, USAID has focused on corridor and landscape conservation, forest management, REDD+ and protected areas, among others. Some important projects included: "Initiative for Conservation in the Andean Amazon (ICAA)" (Peru, Colombia and Ecuador, US$2.5 million), "Alliance for Sustainable Landscapes. (SLPP) SLP-P" (Peru, US$2.0 million);[70] and the "*Alianza Perú* Cacao Phase II" (Peru, US$4.0 million), among others. USAID channels its donations through public institutions and CSOs, but the latter mostly include international foundations or large NGOs with a recognized track record in the countries where they are located.

The USFWS financed an estimated US$4.1 million, focusing almost exclusively on the conservation of species and critical habitats. An important point to note for this donor is that it tends to finance national CSOs, promoting improved governance and local development. The most important project financed by the USFWS was been the "Protection of critical wintering habitat for neotropical migrant birds in Ecuador" (US$1 million).

The European Union (EU) financed US$35 million in the 2015 - 2019 period. The EU's large projects are also aimed at government agencies or various public and private agents. The preferred topics are watershed conservation, landscape and biological corridors conservation, climate change adaptation and mitigation, and the promotion of economic incentives for conservation, among others. Some noteworthy projects include: "Integral Management of Water and Natural Resources" (Bolivia, US$13.5 million), the "*Páramos*: Biodiversity and Water Resources in the Northern Andes" regional project (Colombia, Ecuador and Peru, US$4.8 million) and "Sector Reform Contract for Sustainable Local Development in Colombia" (Colombia, US$3.5 million). The latter was a project that sought to promote local sustainable development and the livelihoods of populations living in socially and environmentally sensitive areas through the responsible use of biodiversity, ecosystems, goods and services (green growth). The EU supported the management of the protected areas system in Bolivia until 2014, ceasing to do so as of 2015.[71]

[69] The United States Forest Service (USFS) provided technical assistance to Peru in the areas of forest management, institutional strengthening and transparency and channeling USAID funds. It had a major impact especially in the Amazon region. A USFS project of high importance was: Peru Forest Sector Initiative - PFSI, executed until 2017. (http://www.brucebyersconsulting.com/wp-content/uploads/2018/03/Peru-Forest-Sector-Initiative-PFSI-Final-Evaluation-Report-September-2017.pdf)

[70] The Sustainable Landscapes Partnership Project. SLP-P seeks landscape conservation in Rioja and Moyobamba. Implemented by Conservation International, it seeks to promote economic development while protecting nature through the implementation of "sustainable landscapes". See more at: https://www.conservation.org/peru/iniciativas-actuales/slp-miradas-sonstenibles-por-un-futuro-mejor

[71] MINISTRY OF ENVIRONMENT AND WATER and SERNAP, 2017. Institutional Strategic Plan 2016 - 2020.

The Swiss Agency for Development and Cooperation (SDC) provided around US$22.4 million in financing for the 2015- 2019 period, focusing exclusively on climate change. The *Biocultura* Program funded an estimated US$4.7 million in Bolivia. The "Sharing Knowledge and Experiences to Protect Andean Forest Ecosystems" project invested an estimated US$8.9 million in the seven hotspot countries. Finally, the "Andean Forests" program[72] provided US$1.2 million in support to the seven countries of the hotspot in its phase II. The SDC has finances projects that are been executed by public institutions but with occasional support from CSOs.

NORAD invested US$17.4 million in nine projects, mainly focused on reducing deforestation and related emissions (REDD+), as well as sustainable management of forests and other natural resources. The beneficiaries of NORAD grants have sometimes been indigenous organizations at the national level, as well as governments and government agencies. Notable projects include: "Providing intelligence to combat illegal logging and timber trade" (Colombia and Peru, US$4.3 million); "Deforestation-free supply chains through public-private partnerships and mobilizing Asian and U.S. markets" (Colombia and Peru, US$3.5 million); and "Reducing deforestation by working with policy-makers" (Peru, US$2.2 million), among others.

The Belgian cooperation (CTB) financed two projects with US$6.4 million in the period 2015 – 2019. The most important of these, the "Integrated management of natural resources in the departments of Apurímac, Ayacucho and Huancavelica (PRODERN II)" project (Peru, US$4.8 million) has sought to conserve and sustainably use natural resources and biological diversity and contribute to poverty alleviation. Belgian cooperation has exclusively finances ministries of the environment and other public institutions.

Japanese cooperation, through JICA, has also financed two projects for an estimated US$4.5 million. The most important of these was the "Forest Conservation Program in the departments of Amazonas, Lambayeque, Loreto, Piura, San Martín, Tumbes and Ucayali", which partially influenced the hotspot with an estimated US$4.0 million". JICA has exclusively finances public institutions in the national governments.

France, through the French Development Agency (AFD by its acronym in French), has invested US$3.1 million in four projects dedicated to community development and local governance, as well as watershed conservation. AFD has channels its investments through CSOs.

Danish cooperation (DANIDA) financed projects worth US$2.0 million (almost exclusively to public institutions in Bolivia and FUNDESNAP), including the "Support to the National Protected Areas Service of Bolivia - SERNAP" and the "Innovation Fund for the Promotion of Sustainable Productive Innovations in Bolivia (FI)", executed by FUNDESNAP, with US$0.8 million divided among other projects. This cooperating source reduced its funding compared to the previous period when it invested US$8.3 million in the hotspot.

Other bilateral donors with smaller contributions to the hotspot were the Government of Canada, with the "Forest Carbon Partnership Facility" as one of its largest contributions, and the "Strengthening Natural Resource Management in Peru" project (US$1.0 million). On the other hand, Australian Cooperation funded US$0.3 million and the Spanish Agency for

[72] http://www.bosquesandinos.org/

International Development Cooperation (AECID by its acronym in Spanish), which also greatly reduced its contribution, invested US$20 000.

Table 11.34. Summary of Major Bilateral Donors in the Tropical Andes Hotspot, 2015 – 2019

Country	Donor	Main areas of intervention	Number of projects	Amount (US$ million) 2015 - 2019	Average per intervention (US$ million / project)
Germany	KfW	Support for protected areas systems in hotspot countries, climate change (REDD+) and economic incentives for conservation, among others.	12	45.0	3.7
	GIZ	Climate change, institutional strengthening, watershed conservation and economic incentives for conservation	15	30.5	2.0
	BMU	Climate change and sustainable management of forests and other natural resources	13	12.8	1.0
	International Climate Initiative (IKI)	Climate change (and indirectly other issues such as economic incentives for conservation)	12	4.7	0.4
United States	USAID	Corridor and landscape conservation, forest management, REDD+ and protected areas, among others.	34	36.9	1.1
	USFWS	Conservation of species and critical habitats	36	4.0	0.1
	Inter-American Foundation - IAF	Community development and local governance	1	0.10	0.1
European Union	---	Watershed conservation, landscape and biological corridor conservation, climate change adaptation and mitigation and the promotion of economic incentives for conservation, among others	53	35.0	0.7
Switzerland	SDC	Climate change: adaptation and mitigation.	6	22.4	3.7

Norway	NORAD	Reducing deforestation and emissions from deforestation (REDD+), as well as sustainable management of forests and other natural resources.	8	17.4	2.2
Belgium	CTB	Conserve and sustainably use natural resources and biological diversity and contribute to poverty alleviation	2	6.4	3.2
Japan	JICA	Forest conservation, environmental monitoring and capacity building.	2	4.5	2.3
France	AFD	Community development and local governance, as well as watershed conservation.	4	3.1	0.8
Denmark	DANIDA	Promotion of sustainable productive innovations and support for protected areas in Bolivia.	7	2.0	0.3
Canada	Government of Canada	Climate change (REDD+) and economic incentives for conservation.	3	1.4	0.5
Australia	Australian Agency for International Development	Climate change: adaptation and mitigation	2	0.3	0.1
Spain	AECID	Climate change: adaptation and mitigation and watershed conservation	1	0.02	0.0

National Public Investment

Public investment funded US$249.5 million for the 2015 - 2019 period in the hotspot. Public investment from Bolivia, Colombia, Ecuador and Peru is analyzed below. Argentina, Chile and Venezuela, have not been analyzed because they are outside the scope of the study.

The protection and proper management of national governments' protected area (PA) systems are directly linked to biodiversity conservation. Of the total amount invested in the management of protected areas in the hotspot, estimated at US$127.7 million, the national governments have contributed around US$61.1 million (24.5 percent) for the coordination and administration of their PAs, a lower amount than that provided by international cooperation (US$66.6 million) for the same task. It is estimated that from the US$66.6 million contributed by international cooperation, about US$50 million was channeled through ministries, government agencies or other national or regional public agents.

An estimate of US$30.1 million (12.1 percent) was invested by national governments in landscape and biological corridor conservation. The most important project in this area was financed by Ecuador: "National Forest Restoration Program for Environmental Conservation, Watershed Protection and Alternate Benefits", of which, an estimate of US$13 million, from its original US$288.7 million budget, has been executed in the hotspot during the 2015 - 2019 period. Biodiversity research and environmental monitoring benefited from a public investment of US$10.4 million (4.2 percent) and species conservation from a public investment of US$8.2 million (3.3 percent).

National government financing for REDD+ plans was been significant. However, all expenditures made have not been recorded under this mechanism, so its quantification is a challenge. An approximation of the investment made in the hotspot shows that national governments invested US$2.3 million (0.9 percent of total public investment, and only 5 percent of total REDD+ funding). In other words, investment for REDD+ projects came mostly from external sources, which channeled almost all funding through the national governments, with a few exceptions.[73]

Regarding other issues related to natural resource management, public investment was directed towards forest and other natural resource management (US$42.1 million) and planning and policy and institutional strengthening (US$41.5 million). Topics such as climate change adaptation and mitigation received less attention. Of the US$98.2 million investment in climate change adaptation and mitigation, only US$16.6 million came from public investment, mostly from Ecuador (US$13 million), through co-financing of the GEF project ¨Promoting climate-smart livestock management that integrates the reversal of land degradation and reduction of desertification risks in vulnerable provinces". Finally, investments for local governance and community development, as well as capacity building, were very limited (about US$11 million, 4 percent of total public investment).

Regarding the type of investment agent, more than three quarters (76.8 percent) of public investment came from national agents (ministries, national governments, general secretariats, etc.), almost one fifth (18.9 percent) came from regional sources (regional governments, regional environmental corporations, etc.) and 4.3 percent came from other sources of public investment (local governments, regulatory bodies and other public sector sources).

Table 11.35. Summary of Public Investment in the Tropical Andes Hotspot, 2015 - 2019 period

State	Main areas of intervention	Number of projects	Amount (US$ million) 2015 - 2019	Average per intervention (US$ million / project)
Bolivia*	Management of protected areas	16	2.2	0.1
Colombia	Planning, policy and institutional strengthening; Protected areas management; Research on biodiversity and environmental monitoring	159	98.6	0.6

[73] "Promoting Indigenous Peoples rights in REDD+ in Myanmar and Peru" (NORAD, US$754,000), implemented by indigenous organizations or associations; "Focus on the Frontline" (NORAD, US$487,000), also implemented by such organizations; "Improving governance and land use management for addressing the causes of forest loss and degradation and enhancing carbon stocks in Honduras and Peru" (EU, US$300,000), executed by Amazonía Viva; "Alto Mayo Protection Forest" (Walt Disney CSR, US$3.5 million), executed by Conservation International in Peru.

Ecuador	Climate change: adaptation and mitigation; Sustainable forest management and other natural resources; Landscape conservation and biological corridors.	25	69.3	2.8
Peru	Sustainable forest management and other natural resources; Management of protected areas; Landscape conservation and biological corridors	121	79.4	0.7

*Limitations applied to public investment information accessibility in Bolivia.

Foundations

The present study has taken into account foundations with an environmental orientation that have supported projects with natural resource management as their main objective. There are other foundations that fund projects within the hotspot for the improvement of human rights, poverty alleviation, democracy and others. These projects have not been analyzed, even if they had some component or action related to natural resource management. According to the methodology used, foundations donated US$45.8 million across 190 projects in the hotspot for the 2015 - 2019 period. This represents an estimated increase of US$31.1 million over the previous period. Foundations are a very important source of investment for CSOs; of the total funded, US$38.1 million (83.2 percent) was expended by international CSOs and US$17.4 million (38 percent) by domestic CSOs (i.e., generally small NGOs based in the countries of the hotspot).

The increase compared to the previous profile could be due to the fact that, some sources, such as the Blue Moon Foundation, have stopped investing, or the investments of Global Wildlife Conservation and the Swift Foundation are no longer available. On the other hand, other funds such as the Andes Amazon Fund and the Rainforest Trust (the second and third most important) have recently been implemented, which together account for an investment of US$15.6 million.

In order of resources invested, the main foundations, main themes and partners, among others, are described below.

The Gordon and Betty Moore Foundation is the foundation that invested the most in the hotspot in the 2015 - 2019 period, with US$19.8 million (43.2 percent) in 43 projects, US$17.5 million more than for the previous period (2009 - 2013). The prioritized themes were: landscape and biological corridor conservation (54 percent) and protected areas management (29 percent). The implementation partners of the projects financed by the Moore Foundation are almost exclusively CSOs (85 percent), while only 15 percent of the investment is executed by governmental organizations, heritage funds (such as Profonanpe, *Fondo Patrimonio* or *Parques Nacionales Naturales de Colombia*) and universities (such as the *Pontificia Universidad Católica del Perú*, PUCP or the *Universidad de Ingeniería y Tecnología*, UNI). Among the most important projects, the "Consolidation of high biodiversity mosaics in the Andean Amazon" project is estimated to have invested more than US$2 million in Madidi-Tambopata landscape (Bolivia, Peru). On the other hand, the national project "Peru's Natural Legacy: Securing the Future of Peru's Protected Areas" is estimated to have invested around US$1.1 million in the hotspot.

Rainforest Trust is the foundation with the second largest investment in the hotspot. It has funded US$10.67 million in 30 projects (on average US$355,667). This foundation almost exclusively funds the conservation of critical species and habitats, sometimes through the proper protected areas management in coordination with local communities. The execution of its investment is almost 100 percent through national CSOs such as *Fundación de Conservación Jocotoco* in Ecuador and *Fundación ProAves* in Colombia.

The Andes Amazon Fund (AAF) invested US$4.9 million (10.7 percent) in the hotspot for the 2015- 2019 period in 12 projects. AAF funded both national and international CSOs. This foundation, which was new to this hotspot during the 2015 - 2019 investment period, seeks to conserve the biodiversity, ecosystems and health of the Andes and the Amazon. To do so, they establish and expand protected areas so that indigenous cultures and nature can thrive under greater protection.

The John D. and Catherine T. MacArthur Foundation invested US$4.67 million in 35 projects in the 2015 - 2019 period. The investment was lower than in the previous period (US$7.6 million). During the 2015 - 2019 period, it financed topics related to watershed conservation (47 percent of the amount invested) or local governance. Its investments have generally been channeled by international CSOs or large national CSOs. This foundation has no plans to continue funding projects in the hotspot in the coming years.

The Tinker Foundation funded US$1 million in 11 projects and was almost entirely involved in watershed conservation in the following countries, in descending order of the amount invested: Bolivia (58 percent), Ecuador (36 percent), Peru (5 percent) and Colombia (1 percent). This foundation funded large international CSOs.

Rainforest Alliance participated in the co-financing of the GEF project "Conservation and Sustainable Use of the Biodiversity, Forests, Soil and Water for Good Living (Buen Vivir / Sumac Kasay) in Napo Province" with US$400,000. The objective of the project was to increase and improve the supply of goods and ecosystem services in the Napo Province in a sustainable manner. This project was also co-financed by the GEF, Napo province government, ministry of environment, municipalities, GIZ, USAID and FAO.

The Overbrook Foundation invested approximately US$332,000 in 10 projects, US$47,000 more than in the previous period. The priority topics were watershed conservation (60 percent) and capacity building (28 percent). This fund prioritized Ecuador (65 percent of the amount invested), Peru (30 percent), and Colombia (5 percent). This foundation financed CSOs in their entirety.

The Mohamed bin Zayed Conservation Fund invested US$175,000 in CSO projects almost exclusively for species conservation (97 percent). Of the investment in species conservation, 47 percent was for amphibian conservation, 32 percent for bird conservation, 11 percent for primate conservation, 5 percent for bat conservation, and 5 percent for the conservation of felines such as *Leopardus tigrinus*.

The JRS Biodiversity Foundation invested just over US$103,000 in six projects. The projects prioritized research of biodiversity and environmental monitoring (68 percent) and planning, policy and institutional strengthening (32 percent).

The Nature Conservancy (TNC) financed US$133,460 for the *Agua Somos* Program (Colombia), executed by *Fondo Patrimonio*. Other foundations that have invested in the hotspot during this period are: Save Our Species, 11.11.11., WeEffect, Christian AID, Satoyama Development Mechanism (SDM-IGES) and other national organizations that have co-financed some larger projects. For example, Condensan and the Otonga Foundation, which have participated in GEF projects of more than US$3 million.

Table 11.36. Summary of Major Foundations Investing in Natural Resource Management in the Tropical Andes Hotspot for 2015 - 2019 Period

Donor	Main areas of intervention	Number of projects	Amount (US$ million) 2015 - 2019	Average per intervention (US$ / project)
Moore Foundation	Landscape conservation and biological corridors (54 %) and protected areas management (29 %)	43	19.8	460,247
Rainforest Trust	Conservation of species and critical habitats through the proper management of protected areas and in coordination with local communities.	30	10.7	355,761
Andes Amazon Fund	Protected area establishment and expansion for the benefit of nature and indigenous cultures.	12	4.9	412,067
John D. and Catherine T. MacArthur Foundation	Watershed conservation (47% of the amount invested).	33	4.5	136,502
Tinker Foundation	Watershed conservation	11	1.0	95,302
Rainforest Alliance	Conservation and sustainable use of biodiversity, forests, soil and water	1	0.4	400,000
The Overbrook Foundation	Watershed conservation (60%) and capacity building (28%).	10	0.3	33,250
Mohamed bin Zayed Conservation Fund	Species conservation	22	0.2	7,969
JRS Biodiversity Foundation	Biodiversity research and environmental monitoring (68%) and planning, policy and institutional strengthening (32%).	6	0.1	17,261
TNC	Climate change, land and water protection	3	0.1	44,487

Other Donors

The remaining 0.4 percent of the total conservation investment in the hotspot originated from two private companies. Walt Disney financed the REDD+ project "Alto Mayo Protected Forest" through its Corporate Social Responsibility and the company *Verde Canandé* co-financed the GEF project "Sustainable Development of the Ecuadorian Amazon: Integrated Management of Multiple Use Landscapes and High Value Conservation Forests". See Table 11.37.

Table 11.37. Summary of other Donors Investing in Natural Resource Management in the Tropical Andes Hotspot for 2015 - 2019 period

Donor	**Countries where investments were made**	**Main areas of intervention**	**Amount (US$)**
Walt Disney	Peru (1 intervention): "Alto Mayo Protected Forest REDD+ Project".	Climate Change REDD+	3,500,000
Verde Canandé	Ecuador (1 intervention): co-financing of the GEF project "Sustainable Development of the Ecuadorian Amazon: Integrated Management of Multiple Use Landscapes and High Value Conservation Forests".	Community development and local governance	653,000

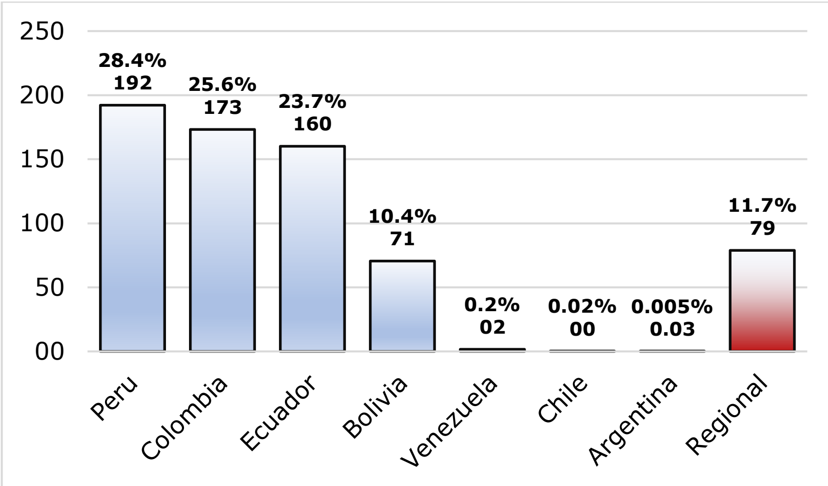
11.6 Investment Summary by Country

By country, the largest investment in the hotspot for the 2015 - 2019 period was made in Peru (US$192.2 million, 28.4 percent), followed by Colombia (US$173.2 million, 25.6 percent), Ecuador (US$160.1 million, 23.7 percent), Bolivia (US$70.5 million, 10.4 percent), Venezuela (US$1.6 million, 0.2 percent), Chile (US$135,000, 0.1 percent) and Argentina (US$32,000, 0.03 percent). However, it should be noted that the investment figures for the latter three countries are underestimated because public investment[74] and a large part of international[75] cooperation were not considered.

[74] This investment was considered outside the scope of this study.

[75] Only country-level projects were considered for those countries with at least 20 percent of their surface area in the hotspot, thus excluding country-level investments in Argentina, Chile and Venezuela.

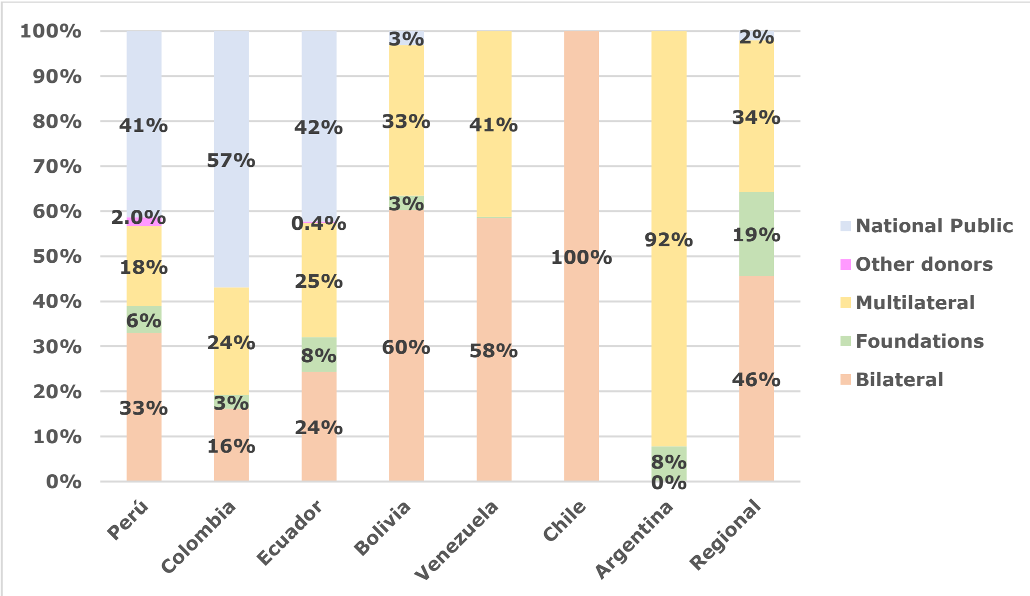
Figure 11.11. Investments in Natural Resource Management by Country (in US$ Millions and Percentage of Total). Total = US$676.6 Million, 2015 - 2019 period



* The regional column considers projects financed by two or more hotspot countries.

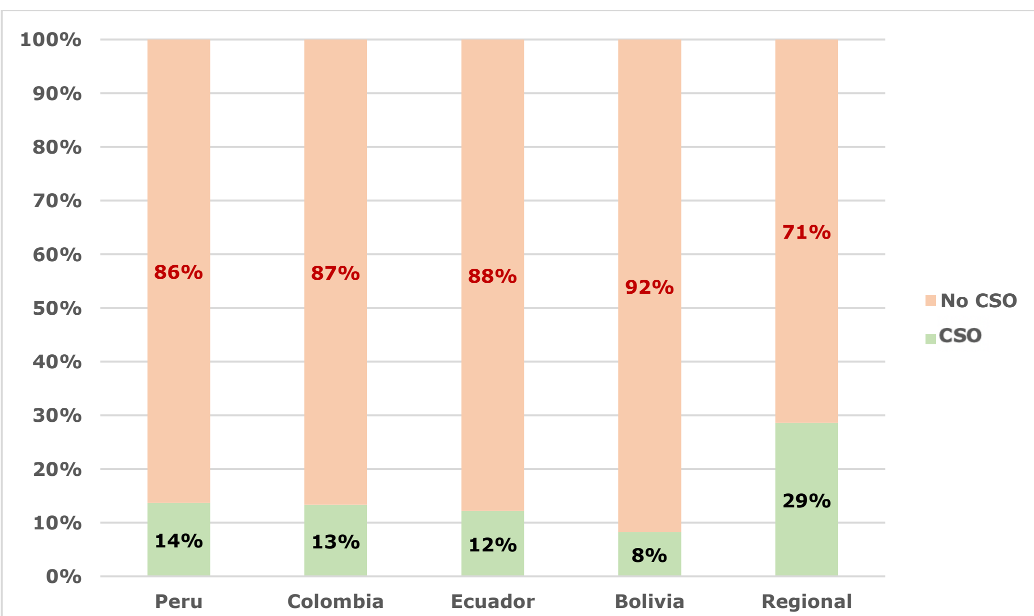
In Colombia, public sources contribute a higher percentage (57 percent) of total financing than international cooperation (43 percent). On the other hand, in both Peru and Ecuador, international cooperation has a greater weight (58 percent) than public investment (42 percent). In the case of Bolivia, it is possible that public investment is underestimated, but it is interesting to note that bilateral sources outweigh multilateral sources and foundations. Finally, we do not have sufficient data for Venezuela, Chile and Argentina in general, as the inclusion of projects was conditional on the methodology and scope of the study (Figure 11.12).

Figure 11.12 Percentage of Total Investment in the Tropical Andes Hotspot for Natural Resource Management by Source and Country, 2015 - 2019 period



Finally, an analysis of project execution by organization shows that most of the investment is expended by organizations other than CSOs (governments, ministries, education institutes, endowments, etc.), only regional initiatives have a slightly higher percentage of execution by CSOs (Figure 11.13).

Figure 11.13 Proportion of Investment Execution by Executor and by Country in the Tropical Andes Hotspot, 2015 - 2019 period



Eighty-seven projects identified as regional initiatives, with financing in more than one hotspot country, totaled almost US$79 million investment. The most important regional donors were: NORAD (US$14.5 million), GEF (US$12.6 million), European Union (US$11.8 million), Moore Foundation (US$11.7 million), SDC (US$10.1 million), USAID (US$5.8 million), Germany through the International Climate Initiative (IKI, US$4.7 million), UNEP (US$2.1 million) and CEPF (US$2.0 million). At the regional level, biodiversity conservation funded about US$32.1 million (40.8 percent), while other themes encompassing natural resource management executed US$46.7 million (59.2 percent). These projects are generally channeled through partnerships between various public and private actors.

11.7 Gap and Opportunity Analysis

Geographic funding gaps

Investments for natural resource management were unevenly distributed across the seven Tropical Andes countries. Thus, when measuring the total amount invested per country's hotspot area, the country in which the most was invested the most per hotspot hectare was Ecuador (US$14.8 /ha), followed by Colombia (US$5.5 /ha), Peru (US$5.0 /ha), Bolivia (US$2.2 /ha), Venezuela (US$0.3 /ha), Chile (US$0.12 /ha) and Argentina (US$0.03 /ha).

The summary of natural resource management investment in corridors prioritized in this profile is shown in Table 11.38.

Table 11.38. Investment in Natural Resource Management in Priority Corridors in the Tropical Andes Hotspot, 2015 - 2019 period

Corridor	Country	No of projects	Adjusted amount (US$ million)	Corridor area (ha)	Amount / corridor area (US$/ha)
Northeastern Peru	Peru	24	8.3	1,811,338	4.6
Madidi-Pilón Lajas-Cotapata	Bolivia - Peru	29	3.9	5,055,482	0.8
Northeastern	Ecuador	17	3.3	1,290,706	2.6
Awá-Cotacachi-Illinizas	Ecuador - Colombia	33	3.2	2,039,201	1.6
Cordillera de Vilcanota	Peru	22	2.5	2,186,306	1.1
Paraguas-Munchique-Bosques Montanos del Sur de Antioquia	Colombia	36	2.3	2,068,599	1.1
Sangay Podocarpus	Ecuador	15	1.5	927,212	1.6
Total		**176**	**25.0**	**15,378,844**	**2.3**

Source: Own elaboration

CEPF was the largest donor in terms of investment and number of projects financed in priority corridors, with an investment of US$7.5 million in 95 projects (Table 11.39). Some of the most funded projects were: 1) "Strengthening Local Capacities to Conserve Polylepis Forests and their Threatened Biodiversity in the Madidi and Cotapata national parks in Bolivia" (US$226,428), 2) "Strengthening a community conservation model in the Serranía de los Paraguas in Colombia" (US$268,090), 3) "Promoting altitudinal connectivity and conservation in the Cotacachi-Awa Conservation Corridor in Ecuador" (US$195,329). In addition, the project "Protection and Sustainable Development in the Kosñipata Carabaya Key Biodiversity Area in Peru - Phase II," co-financed with the Rainforest Trust Foundation and currently under execution, has an investment of US$368,600.

Two donors financed 72.7 percent of the amount invested in the Northeastern Peru Corridor: Walt Disney with its REDD+ investment in the Alto Mayo Protected Forest (US$3.5 million) and USAID (US$2.1 million), with its "Alliance for Sustainable Landscapes" project implemented in the upper Alto Mayo river basin. These two projects have made a difference and have positioned Peru's Northeastern Corridor as the most financed of the priority corridors.

The GEF was the third largest donor in the priority corridors with a total investment of US$2.8 million. Its projects were "Conservation and Sustainable Use of Biodiversity, Forests, Soil and Water to Achieve Good Living (Buen Vivir/Sumac Kawsay) in Napo Province" with a GEF allocation of US$2.1 million, with national co-financing, and "Sustainable Management of Biodiversity and Water Resources in the Ibarra-San Lorenzo Corridor" (US$675,000).

In addition, the Andes Amazon Fund (AAF) invested US$2.7 million in eight projects to improve the management and expansion of the protected areas system in some prioritized corridors. The largest project was in the Cusco Region (Peru): "Creation of a regional system of protected areas in the southern Peruvian Amazon" in the Vilcanota Cordillera Corridor. In addition, four AAF projects in the Madidi-Pilon-Lajas-Cotapata corridor totaled more than US$2.0 million.

Finally, in the Sangay Podocarpus Corridor (Ecuador), US$1.2 million was invested, of which approximately 70 percent has been expended by the Nature and Culture International Foundation (NCI) in projects financed by CEPF, AAF and Rainforest Trust.

Table 11.39 summarizes the amounts and number of projects invested by for major donors in the priority corridors.

Table 11.39. Major Donors in Priority Corridors, by Number of Projects and by Amount Invested (US$ Millions), 2015 - 2019 period

Source	No of projects	Amount invested in prioritized corridors (US$ millions)
CEPF	95	7.5
Walt Disney	1	3.5
GEF	2	2.8
Andes Amazon Fund	8	2.7
USAID	1	2.1
Rainforest Trust	10	1.7
GORE San Martín	3	1.2
John D. and Catherine T. MacArthur	4	0.9
GEF small grants	26	0.7
USFWS	5	0.4
DANIDA	5	0.3
Tinker Foundation	1	0.1
Others	15	1.1
Total	**176**	**25.0**

Thematic Gaps and Opportunities

Although investment in natural resource management, which includes funding for issues not directly related to conservation, has increased (US$62 million over the previous period), investment in biodiversity conservation, resources that are directly related to conservation, decreased by US$28.7 million. The availability of financial resources is not the only limiting factor. For conservation to be more effective, the right people/organizations need to be provided with the right type of support, at the right time. While the resources available for investment in the hotspot by CEPF are only modest in the context of the overall funding landscape, they can have a disproportionate impact if they are well targeted. Investment in sustainable forests management and other natural resources, planning, policy and institutional strengthening or economic incentives for conservation, among others, has increased, while funding for protected area management, landscape and biological corridor conservation or REDD+ has decreased. Some of these are all topics that CEPF has invested in significantly in some of these thematic issues in recent years.

National governments are an important source of the financing for protected areas, although they are still very dependent on international cooperation (52.2 percent). In addition, planning documents on the sustainability of protected area systems have shown that in most of them, there are still huge financing gaps that threaten their economic and environmental sustainability.[76] This, added to the US$33.9 million less allocated for this theme, would indicate the need to increase funding for protected areas in the hotspot for the next funding period. It should also be noted that a thorough assessment of the efficiency of the investments is not being made, however, not only more funding is needed, but greater efficiency would also be necessary. CEPF can help to close these gaps with strategic investments.

Landscape and biological corridor conservation has also suffered a reduction in funding of US$15 million with respect to the previous period. Considering that the United Nations General Assembly declared 2021-2030 as the United Nations Decade for Ecosystem Restoration and that FAO and UNEP will lead the implementation of projects, this could be an opportunity for CSOs to join initiatives or platforms in pursuit of restoration. In that sense, the 20x20 initiative seeks to change the dynamics of land degradation in Latin America and the Caribbean through restoration of 20 million hectares of forests, farms, grasslands and other landscapes.

Thanks to international cooperation and large climate funding agencies such as GCF, GEF and IKI, fubds for climate change adaptation and mitigation increased by US$7.1 million over the previous period. For the next funding period, it would be beneficial to enhance the linkage of REDD+ projects to the conservation of landscapes, corridors and protected areas, increasing public investment in these areas. The return of the United States to the Paris Agreement and the firm commitment of the European Union to climate change goals predict an increase in the

[76] According to the Institutional Strategic Plan 2016 - 2020 of the National Protected Areas Service – (SERNAP by its acronym in Spanish) in Bolivia, it is estimated that more than double the financial resources (around US$ 20.2 million) would be needed to carry out effective management in the protected areas of the Bolivian hotspot. Following the document "Estimation of the Financial Gap of the Protected Areas of the National Natural Parks System" (2018) of the Sustainability and Environmental Business Sub-Directorate of PNN of Colombia, the gap in the protected areas of the Colombian hotspot would be estimated to be between US$8.9 million and US$21.6 million more per year. Finally, through the Financial Plan of the National Service of State Protected Areas (SERNANP by its acronym in Spanish) in Peru, financing needs for the protected areas of the Peruvian hotspot are estimated at more than US$10.3 million per year.

funds available for this issue, so it is strategic for Andean CSOs to strengthen their capacity to manage these types of projects.

Projects with economic incentives for conservation have increased their investment in the hotspot by more than US$10 million, which indicates their merit for continued support. A good way to maintain biodiversity is to incentivize conservation by enhancing the economic value of intact forests. Pilot projects implemented by CSOs are an interesting strategy that can be easily scaled, as they impact the local economy in a sustainable way and have synergies with ecosystem conservation.

CSOs had very limited access to conservation funding. Only US$57.6 million was available to national CSOs based in any of the hotspot countries for the period 2015 - 2019 (8.1 percent of total investment in the hotspot). However, if the ten largest projects (over US$1 million each [77]) are not taken into account, funding for the remaining 400+ CSOs and 575 projects has been only US$36.1 million, which is equivalent to US$18,050 per CSO per year. These CSOs, on the other hand, are backbone entities of the territory since they are in direct contact with the local population and know the territory where they are located. For this reason, it would be extremely important to dedicate more funds to financing projects executed by national CSOs based in the hotspot territories. CEPF's investments in strengthening the capacities of CSOs will increase the impact of its conservation actions.

The GEF SGP grants are large in number and small in size (US$30,000 on average). These grants are usually executed by CSOs, are geographically balanced and are executed by organizations devoted to the territory, thus, in close contact with rural populations and indigenous communities. A similar benefit to territorial structuring is offered by CEPF and the Rainforest Trust grants.

The extraordinarily threatened biodiversity of the Tropical Andes Hotspot is not matched by the resources needed for its conservation. Only 4.5 percent of the resources allocated to the entire hotspot is allocated for species-specific conservation projects. CEPF can contribute to narrowing this gap.

The US$676.6 million invested in the hotspot in the 2015 - 2019 period is a very low amount relative to investment in large mining or infrastructure projects, which cause profound impacts on the environment. As a comparison, COSIPLAN's 2017 portfolio of road infrastructure projects registered a total of 562 projects with an estimated investment of US$198 billion, as explained in detail in Chapter 8. Increased control by national governments and improved measures for monitoring and mitigation of environmental and social impacts are key to maintaining peace and not reversing what has been achieved through investments in conservation. To this end, planning, policy and institutional strengthening must continue to be improved.

[77] Executed by: Forest Trends, AIDESEP, FEDEGÁN or the Jocotoco Conservation Foundation.

12. CEPF INVESTMENT NICHE

Chapters 3 to 11 examine a wide variety of key drivers and factors that influence the conservation of biodiversity in the Tropical Andes Hotspot. These chapters also identify opportunities that hold promise for shaping biodiversity conservation for not only the next five-year investment phase, but for many decades to come. The preparation of the CEPF investment niche represents a distillation of the key findings from the analysis undertaken in this update of the ecosystem profile, consultations from more than 268 stakeholders from the hotspot, and recommendations arising from the Tropical Andes long-term vision that seeks to put the hotspot on a strong trajectory toward independence from CEPF funding over the medium to long term.

The fundamental mission of CEPF is to empower civil society to be stewards of their critical ecosystems. CEPF seeks to strengthen local civil society groups so that they can effectively respond to current and future conservation challenges in the hotspot. The key findings form the profile help to inform the CEPF investment niche.

12.1 Key Findings

The results presented in the ecosystem profile reaffirm previous research and highlight the extraordinary biodiversity of the Tropical Andes Hotspot. Its more than 130 ecosystems are home to more than 35,000 plant and vertebrate species, of which almost half are endemic and 1,451 are threatened with extinction according to the IUCN Red List, including 239 Critically Endangered (CR) and 625 Endangered (EN) species.

The hotspot provides essential ecosystem services for the planet and for the approximately 59.7 million people living within the Tropical Andes. Its mountains are the headwaters of the Amazon River and major tributaries of the Orinoco River and the Paraguay River, the three main river arteries of South America. The Tropical Andes is the second most important hotspot in the world for irrecoverable carbon stocks. It guarantees the provision of water for consumption and agricultural production, food, energy and materials for housing construction, climate regulation and disaster prevention, to name a few of the key ecosystem services.

Despite their strategic importance, of the 474 KBAs in the hotspot, 173 KBAs lack protection, and of these, 44 KBAs correspond to AZE sites.

The majority of the hotspot's population is mestizo; however, some 10 million indigenous people, belonging to 50 peoples and nations, call 21 percent of the hotspot's surface area, including several KBAs, as their ancestral territory. The indigenous people of the hotspot are often natural allies, and as such, any conservation strategy must collaborate closely with indigenous organizations to strengthen their capacities for the sustainable management of their territories.

The total estimated investment in natural resource management in the hotspot for the period from 2015 to 2019 amounted to US$676.6 million, which is an increase in overall funding for natural resource management by US$62 million. However, funding specifically dedicated to biodiversity conservation fell by US$28.7 million when compared with the 2009 to 2013 period. Despite its exuberant diversity of species, species-level conservation received just 4.5 percent of the total investment dedicated to conserving the hotspot between 2015 and 2019. The allocation to local civil society groups for conservation was US$57.6 million between 2015 to 2019, which may appear significant. However, considering the funding was for a five-year period and spread across a land area three times the size of Spain, it is immediately clear the funding allocation is dwarfed by the needs of a hotspot as large, as threatened, and as biodiverse as the Tropical Andes.

The hotspot faces serious problems: mining, climate change, agricultural encroachment, logging, illegal land occupation, hunting and wildlife trafficking and infrastructure development, among others. In the period from 2001 to 2019, the hotspot lost almost 4 million hectares of forest. Similarly, glacier masses continue to decrease to the point that, in a few years, Venezuela will be the first Andean country to lose all its glaciers. Likewise, mining concessions granted by national governments cover 11 percent of the hotspot and illegal mining continues to be a problem that is difficult to solve. Agricultural expansion affects 65 percent of the 474 KBAs in the hotspot to varying degrees and has altered 31 percent of the hotspot's surface area.

These threats directly impact environmentalists and indigenous communities. According to a report by Global Witness, Colombia was the country with the highest rate of assassinations worldwide of environmental leaders in 2019, and that high rate continues to date, including in several KBAs where CEPF has invested. Environmental defenders throughout the Andes work courageously under threats to their physical wellbeing. CEPF has supported strategies and activities to counteract these threats to its partners with good results, however threats continue and reflect the urgency to safeguard those environmental defenders and their communities at risk.

Between 2019 and 2021, the hotspot countries suffered the consequences of severe political instability and governance crises that resulted in civil unrest, particularly in the capitals and major cities of Bolivia, Chile, Colombia, Ecuador and Peru. For example, during the preparation of this ecosystem profile, Peru had three presidents in one week in November 2020.

The COVID-19 pandemic has dramatically affected the Tropical Andes. It resulted in the death of nearly 110,000 people in Colombia, Ecuador, Peru and Bolivia as of January 2021. According to the IMF, the pandemic is causing the worst regional recession recorded in history. The Economic Commission for Latin America and the Caribbean states that in 2020 the GDP of the hotspot countries decreased between 5.2 percent in Bolivia and 12.9 percent in Peru. The economic crisis resulted in budget cuts to conservation programs, which will continue in the coming years. The budget cuts have hit many protected areas management especially hard, including KBAs. Furthermore, the serious economic crisis is already increasing poverty, which is putting more pressure on natural resources.

In this context of humanitarian crisis and economic uncertainty, the price of an ounce of gold reached an all-time high and surpassed US$2,000, which has intensified gold mining in the hotspot. This confluence of factors has led to an increase in threats to the hotspot's biodiversity and uncertainty about the ability to manage these threats in the short term.

However, with increasing evidence of the linkages between anthropogenic impacts on nature and the spread of zoonotic diseases such as COVID-19, the pandemic may generate new funding opportunities to drive economic recovery based on green policies. These new windows of opportunity should be seized to leverage funding during the implementation of the CEPF Phase III investment.

CEPF has had a long-standing commitment to conservation of the Tropical Andes Hotspot through two investment phases. In Phase I, CEPF invested US$8.135 million through 67 projects in Bolivia and Peru between 2001 and 2006 with a consolidation phase from 2009 to

2013. In Phase II, CEPF invested US$9.5 million through 100 projects in Colombia, Ecuador, Peru, and Bolivia, from 2015 to 2021.

The results of these investments were significant. More than 5.1 million hectares came under new legal protection, and approximately 11 million hectares of habitat possessing among the highest levels of biodiversity and levels of threat in the hotspot experienced management improvements in support of biodiversity conservation and local communities. In the Phase II investment period, 286 globally threatened species benefited directly from CEPF funding, and CEPF grantees identified an astounding 74 species as being new to science. More than 294 indigenous and mestizo communities scattered across the far reaches of highest mountain range of the Americas benefitted from the conservation of their ecosystems, through the generation of new sources of income, improved access to clean plentiful water, improved food security, and strengthened governance of their lands. Nine indigenous groups developed new tools and capacities resulting in improved protection and management of their territories. More than 100 stakeholder alliances brought governmental, civil society, community, and private sector stakeholders together to collaborate on conservation and sustainable development initiatives.

In Phase II, 55 Andean-based civil society organizations were grant recipients. More than 80 percent of the 100 grants awarded supported capacity building activities to local organizations and stakeholders. CEPF funded an array of institutional building activities, such as organizational strategic plans, fundraising plans, financial manuals, communication strategies, upgraded websites and financial systems, to name a few. More than 10,000 people received formal training focused on project management and a variety of technical areas.

The second investment phase established a solid foundation to launch the third phase: partners and CEPF are strengthened to face crises and execute portfolio projects successfully to achieve long-term impact results.

In summary, while the countries of the Tropical Andes are home to the world's most biologically diverse hotspot that has the second most important stocks for irrecoverable carbon, the hotspot is undergoing a crisis not encountered in the last century. Pressures on natural habitats and biodiversity are increasing while governments are forced to reduce their budgets for biodiversity conservation. Governments are emphasizing a model of economic growth based on the exploitation of their rich natural and mineral resources. The historical gains in eradicating poverty and conserving biodiversity are fundamentally at risk in some countries. This trend may well continue for several years until the Andean economies recover. Juxtaposed to these significant challenges, the impacts of climate change will continue to stress the hotspot's carry capacity.

Civil society has a critic role to play to facilitate a green recovery that supports development models based on social and environmental sustainability and resilience, built upon the conservation of vital habitats and species. Through CEPF, civil society organizations have worked in complex and at times contradictory environments. They have built relationships of trust with communities and public entities at all levels. Their accumulated experience puts the civil society community in an outstanding position to promote solutions for sustainable development, conservation, and the fight against climate change.

12.2 The CEPF Niche

In light of the urgent needs created and/or exacerbated by the COVID-19 crisis, the CEPF niche for Phase III in the Tropical Andes channels support to civil society organizations to foster the long-term sustainability and resiliency of the results achieved through previous CEPF investments. CEPF support is also intended to replicate the best conservation practices piloted to date to benefit those new sites of exceptional levels of biodiversity that have crucial conservation needs required to ensure their survival.

The niche builds on experience from the first two investment phases by focusing on approaches that have demonstrated success, moving from pilot projects to longer-term interventions, and integrating results more concretely into public policy and private sector practice. It has been developed in consultation with local experts though national and regional consultations. The niche also supports the recommendations of the long-term vision for of the Tropical Andes hotspot.

Phase III continues CEPF support to four of the seven Andean countries: Colombia, Ecuador, Peru and Bolivia. Direct investment in Argentina and Chile are excluded because of their KBAs have significantly lower relatively biodiversity values than KBAs located in their northern neighboring countries. Similarly, KBAs in Venezuela are excluded from direct investment due to the challenging operating environment in the country. However, civil society organizations from Argentina, Chile and Venezuela will be invited to participate in virtual capacity building and networking activities to be able to take advantage of CEPF support.

The niche seeks to support those critical enabling conditions required for sustainable and resilient approaches to curb the loss of global biodiversity at three levels: species, sites, and corridors. In the short term, the niche seeks to support local communities to cope with impacts of the pandemic and to stem environmental degradation impacting the priority KBAs by supporting secure land tenure, fostering sustainable livelihoods, and combating wildlife trafficking and hunting. For the long term, pursuing sustainability and resiliency objectives are front and center of the niche, by solidifying the technical and project management capacities of local civil society, diversifying funding streams for conservation over the long term, and institutionalizing conservation outcomes into public and private sector strategies and practice. Strengthening indigenous and environmental civil society groups is also a high priority. Climate change was identified as the most important threat in the hotspot, and it offers the opportunity for funding future conservation projects. For these reasons, the new niche puts a stronger focus than in previous investments periods on integrating climate change mitigation and adaptation and strengthening alliances with larger private sector companies.

Recognizing that CEPF investment cannot realistically respond to the full range of conservation issues at play in the hotspot, the CEPF niche focuses on actions where civil society organizations can add the greatest value, and addresses gaps in the overall landscape of donor funding for conservation. The niche calls for working closely with public and private conservation donors to ensure complementarity of funding priorities and to identify opportunities for synergies.

The Phase III investment strategy builds on the significant accomplishments achieved by CEPF and partners to date in the hotspot, while setting a new stage toward greater resilience and sustainability over the long term. Although ambitious, the investment strategy is realistic. It represents an important opportunity to realize the potential of civil society in the hotspot to help overcome the current challenges of the hotspot, and to make a lasting contribution to the conservation of the Tropical Andes' unique and irreplaceable biodiversity and ecosystem services of global importance. It also presents an apportunity for nature-based solutions for dealing with climate change.

13. CEPF INVESTMENT STRATEGY

CEPF aims to leave a long-term legacy in which civil society groups can serve as effective stewards and advocates to safeguard the hotspot's globally outstanding biological diversity, while ensuring the health of its vital ecosystem services, its resilience in the face of global climate change, and the welfare of its people. The investment strategy described in this chapter lays out a roadmap to achieve this ambitious mission over the 2021 to 2026 period.

The strategy is based on the three planning exercises described in Chapter 2. The first exercise was carried out in Ecuador in preparation of KfW funding for the country. The second exercise relates to the preparation of this ecosystem profile, and simultaneously, the third exercise constitutes the development of the long-term vision for the hotspot. This strategy reflects the priorities and aspirations of Andean civil society groups in the four countries eligible for funding under Phase III: Colombia, Ecuador, Peru and Bolivia. It is based on a rigorous methodological process to identify conservation outcomes and analysis conducted in Chapters 3 to 11, complemented by a participatory process that engaged 268 stakeholders from civil society and government agencies throughout the hotspot. This chapter, therefore, presents CEPF's investment strategy in recognition of these three planning processes.

13.1 KBA and Corridor Prioritization

To ensure that the investment strategy delivers significant and sustained impacts for biodiversity conservation in the KBAs and corridors where investment is expected, the profile identifies a set of priority sites from among the 474 KBAs and 28 corridors identified in Chapter 5 to focus its investments. A detailed description of the prioritization process is provided in Appendix 13.1 and the data for the individual KBAs analyzed are presented in Appendix 13.2.

The process relied on the evaluation of national experts on the highest ranked KBAs in terms of nine criteria:

1. *Biological importance*. Relative biodiversity value of an individual KBA as determined by the presence of threatened species on the IUCN Global Red List.
2. *Degree of threat.* Vulnerability scores based on the risk to a KBA's ecological integrity over a given period of time.
3. *Funding need*. Level of investment by national and international donors for conservation, and the valued added of CEPF funding.
4. *Management need.* Degree of legal protection afforded to the KBA and the capacity and importance of improving the management of the KBA.
5. *Civil society capacity*. Established through the number, capacity, and interest of CSOs working in the area through a common agenda.
6. *Operational feasibility*. Viability of civil society to work effectively at a site, based on a consideration of security risk, legal restrictions and other factors.
7. *Opportunity for landscape-level conservation.* Ability to achieve landscape-scale conservation through linkage to other KBAs.
8. *Alignment with national priorities*. Degree of overlap of the KBA with national conservation priorities established by each country.
9. *Consolidate results achieved by CEPF*. Opportunity and need to consolidate and give

sustainability to the results achieved by previous CEPF investment.

Of the 474 KBAs identified in the hotspot, 52 KBAs have been selected as priorities for funding under the investment strategy (see Tables 13.1 and 13.4). These 52 KBAs cover 4,040,579 hectares, which equals 12.4 percent of the 32.5 million hectares that fall within the boundaries of hotspot's KBAs. Collectively, the 52 KBAs represent the sites with the highest biological value, are under the most threat, are in urgent need of management improvement, are safe to work in, are locations where with CSOs are present, and where promising opportunities exist for conservation at a landscape-scale. In addition, they fulfill national conservation priorities, and they demonstrate important opportunities to build on and consolidate previous CEPF investments. As recommended by stakeholder consultations and the Tropical Andes long-term vision, the 52 KBAs are located within priority conservation corridors in each of the four countries funded in Phase II, to allow for the consolidation and replication of results and best practices obtained by CEPF projects in Phase II, and to ensure that CEPF's investments achieved hotspot-wide results and impacts.

Of the 52 KBAs, 17 sites are protected with more than 80 percent of their area overlapping with a protected area, while 14 KBAs are unprotected with less than 10 percent that overlap with a protected area (Table 13.1). The size of these 52 priority KBAs ranges from 672 hectares in 1 km west of Loja in Ecuador to 436,794 hectares in Yungas Superiores de Apolobamba in Bolivia, with the average size being 77,703 hectares. Most priority KBAs provide vital ecosystem services, supplying water to major cities and agricultural areas, while harboring vast tracts of carbon-rich forests. Of the 52 KBAs, 24 KBAs will consolidate processes supported in previous CEPF phases, and 28 KBAs are new sites that offer important opportunities to adopt CEPF best practices within the corridors where CEPF has worked previously.

To maintain the ecosystem services that depend on priority KBAs, CEPF will target management improvements in seven priority corridors (Figure 13.1), which cover 15,378,844 hectares, or about 9.7 percent of the entire hotspot area. CEPF invested in six of the seven corridors previous investment phases. The largest corridor is Madidi-Pilón Lajas-Cotapata, which traverses the Peru-Bolivia border, at 5,055,482 hectares. The smallest corridor is the Sangay-Podocarpus Corridor in Ecuador at 927,212 hectares. Figure 13.2 presents detailed maps of the priority KBAs and corridors. The investment strategy's focus on supporting priority KBAs within a priority conservation corridor aims to avoid the dispersal of CEPF funding across a large geographic area. It is intended to facilitate an economy of scales and synergies between grants implemented in relative close proximity of each other, to achieve connectivity between KBAs, and ultimately, to achieve durable, resilient corridor-level results and impacts.

Most of the 52 priority KBAs are in Ecuador (24 KBAs) and Colombia (14 KBAs), with fewer in Peru (9 KBAs) and Bolivia (5 KBAs). Several factors account for the higher prioritization scores in the hotspot's northern countries, which are described in detail in Appendix 13.1, with the most influential factor being the presence of more threatened biodiversity in the KBAs of Colombia and Ecuador. The priority list does not include KBAs in Argentina, Chile or Venezuela. Sites in Argentina and Chile have low relative biodiversity values compared to their northern counterparts, as described in Chapter 5. In Venezuela, low operational feasibility makes CEPF engagement difficult.

Figure 13.1. Priority KBAs and Corridors for CEPF Investment in the Tropical Andes Hotspot

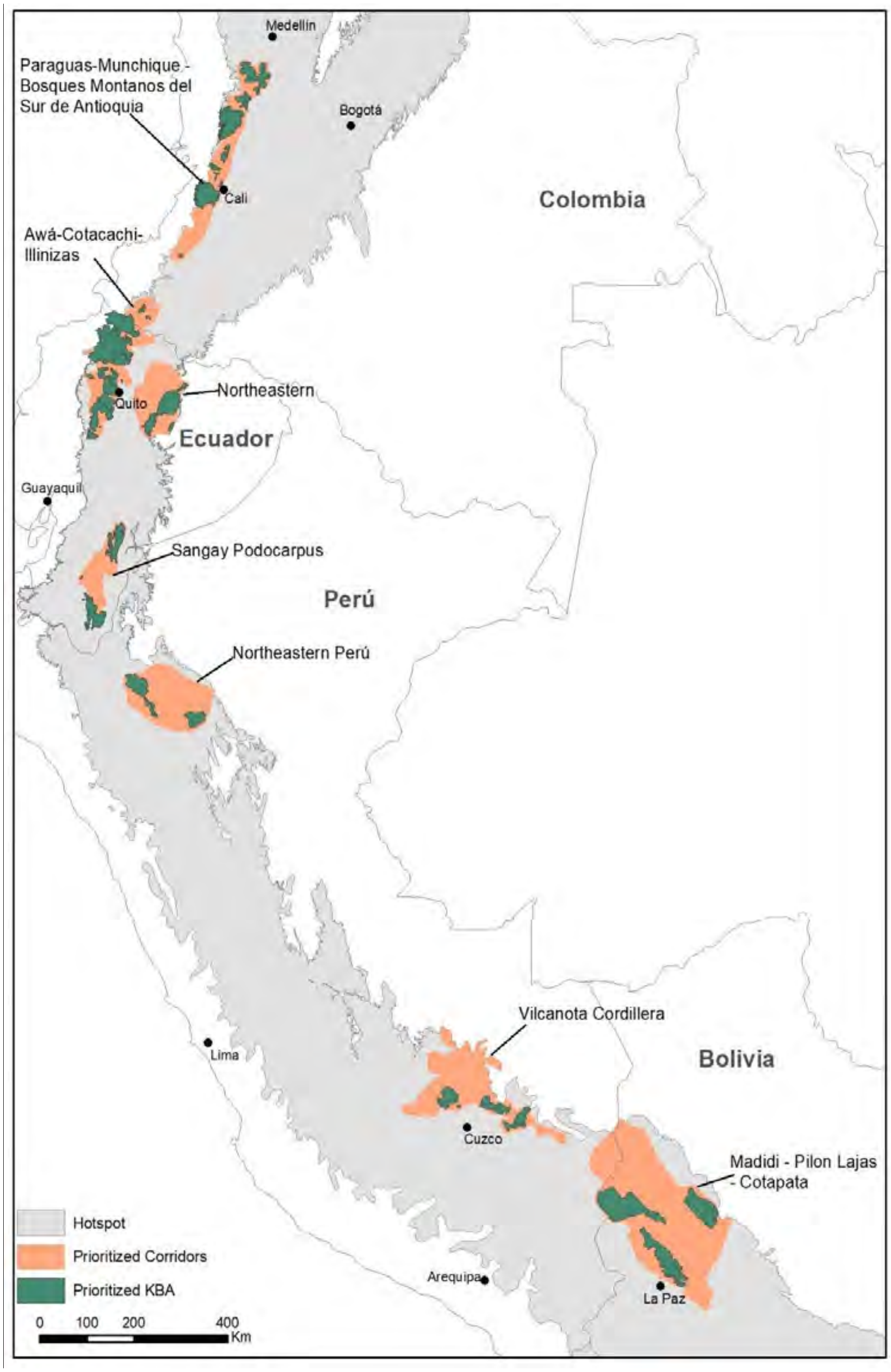


Table 13.1. Priority KBAs for CEPF Phase III Investment in the Tropical Andes Hotspot

#	Country	CEPF code	KBA	KBA area (has)	Hectares and Percentage of KBA protected	Previous CEPF funding	Priorit-ization Score*
1	Bolivia	BOL8	Bosque de Polylepis de Taquesi	3,455.83	0 (0%)	Yes	27
2	Bolivia	BOL13	Cotapata	227,549.41	954.5 (0.42%)	Yes	29
3	Bolivia	BOL45	Parque Nacional y Área Natural de Manejo Integrado Cotapata	57,238.61	56,106.2 (98.02%)	Yes	30
4	Bolivia	BOL37	Yungas Inferiores de Pilón Lajas	249,857.65	238,854.9 (95.6%)	Yes	28
5	Bolivia	BOL39	Yungas Superiores de Apolobamba	436,794.12	436,717.2 (99.9%)	No	27
6	Colombia	COL5	Alto de Pisones	1,380.61	135.1 (9.78%)	No	29
7	Colombia	COL7	Bosque de San Antonio Km 18	5,993.74	4,365.4 (72.83%)	Yes	33
8	Colombia	COL11	Bosques Montanos del Sur de Antioquia	200,574.65	59,772.5 (29.8%)	No	28
9	Colombia	COL36	Enclave Seco del Río Dagua	8,509.33	4,571.6 (53.7%)	No	28
10	Colombia	COL45	La Empalada	10,560.8	2,571.7 (24.3%)	No	28
11	Colombia	COL75	Parque Natural Regional Páramo del Duende	32,136.29	10,672.9 (33.2%)	Yes	30
12	Colombia	COL80	Región del Alto Calima	21,917.65	16,436.9 (75%)	Yes	30
13	Colombia	COL86	Reserva Natural El Pangán	7,726.93	0 (0%)	No	28
14	Colombia	COL88	Reserva Natural La Planada	4,519.83	4,496.4 (99.5%)	Yes	28
15	Colombia	COL91	Reserva Natural Río Ñambí	8,595.15	1,384.15 (16.1%)	Yes	32
16	Colombia	COL106	Serranía de los Paraguas	259,592.27	40,093.3 (15.4%)	Yes	30
17	Colombia	COL109	Serranía del Pinche	4,870.4	1,139.2 (23.4%)	Yes	30

18	Colombia	COL65	Parque Nacional Natural Farallones de Cali	220,153.48	219,762.7 (99.82%)	No	26
19	Colombia	COL74	Parque Nacional Natural Tatamá	59,414.17	37,091.94 (62.43%)	No	25
20	Ecuador	ECU1	1 km al oeste de Loja	672.09	672.09 (100%)	No	29
21	Ecuador	ECU2	Abra de Zamora	7,833.86	7,833.86 (100%)	Yes	37
22	Ecuador	ECU3	Acanamá-Guashapamba-Aguirre	1,994.67	1,174.15 (58.8%)	No	33
23	Ecuador	ECU6	Alrededores de Amaluza	109,051.44	41,428.8 (38%)	Yes	32
24	Ecuador	ECU14	Bosque Protector Los Cedros	5,619.44	0 (0%)	No	35
25	Ecuador	ECU16	Bosque Protector Moya-Molón	12,376.49	989.82 (8%)	No	29
26	Ecuador	ECU25	Cordillera de Huacamayos-San Isidro-Sierra Azul	69,671.31	65,666.3 (94.2%)	No	33
27	Ecuador	ECU28	Corredor Awacachi	16,668.8	1,970.1 (11.82%)	Si	29
28	Ecuador	ECU86	Gualaceo - Limón Indanza	20,315.81	5,061.9 (24.9%)	No	29
29	Ecuador	ECU34	Intag-Toisán	63,884.53	2,291.48 (3.6%)	Yes	29
30	Ecuador	ECU41	Los Bancos - Milpe	3,316.05	3,316.05 (100%)	Yes	36
31	Ecuador	ECU43	Maquipucuna-Río Guayllabamba	21,069.58	20,923.6 (99.3%)	Yes	35
32	Ecuador	ECU89	Mashpi-Pachijal	39,525.55	39,525.55 (100%)	No	30
33	Ecuador	ECU44	Mindo y Estribaciones Occidentales del volcán Pichincha	94,710.22	93,185.09 (98.4%)	Yes	35
34	Ecuador	ECU45	Montañas de Zapote-Najda	9,699.6	2,801.17 (28.8%)	No	32
35	Ecuador	ECU50	Parque Nacional Podocarpus	142,945.61	142,945.61 (100%)	Yes	28
36	Ecuador	ECU52	Parque Nacional Sumaco-Napo Galeras	217,629.87	217,629.87 (100%)	No	33
37	Ecuador	ECU61	Reserva Ecológica Cotacachi-Cayapas	361,615.47	285,668.57 (79%)	No	32
38	Ecuador	ECU42	Reserva Ecológica Los Illinizas y alrededores	169,316.06	141,523.35 (83%)	No	28
39	Ecuador	ECU54	Río Caoní	9,101.37	0 (0%)	Yes	32
40	Ecuador	ECU66	Río Toachi-Chiriboga	7,1188	3,429.71 (4.8%)	No	33

41	Ecuador	ECU81	Saraguro Las Antenas	1,876.24	1,860.56 (99.1%)	No	33
42	Ecuador	ECU64	Reserva Tapichalaca	3,925.89	3,925.89 (100%)	No	28
43	Ecuador	ECU70	Territorio étnico Awá y alrededores	204,930.15	12,569.86 (6.1%)	Yes	30
44	Peru	PER3	6 km sur de Ocobamba	76,568.58	1,151.5 (1.5%)	No	26
45	Peru	PER5	Abra Málaga-Vilcanota	31,083.45	3,282.75 (10.6%)	No	29
46	Peru	PER28	Cordillera de Colán	134,874.13	88,855.9 (66%)	Yes	28
47	Peru	PER44	Kosñipata Carabaya	96,492.93	9,676.9 (10%)	Yes	31
48	Peru	PER50	Lagos Yanacocha	2,439.65	549.3 (22.5%)	No	27
49	Peru	PER65	Moyobamba	91,527.42	3,336.5 (3.6%)	No	26
50	Peru	PER75	Quincemil	58,324.08	9,016.8 (15%)	No	27
51	Peru	PER97	Río Araza	33,956.27	0 (0%)	No	26
52	Peru	PER84	Río Utcubamba	35,534.28	1683.1 (5%)	Yes	30

*Appendix 13.2 shows the ratings for each criterion which, when added together, result in the final quantification.

Table 13.2. Priority Conservation Corridors for CEPF Investment in the Tropical Andes Hotspot

Corridor	KBA	KBA area (has)
Paraguas-Munchique/Páramo de Urrao-Tatamá (Colombia)	**Corridor priority KBA area**	**825,103.39**
	Alto de Pisones	1,380.61
	Bosque de San Antonio/Km 18	5,993.74
	Bosques Montanos del Sur de Antioquia	200,574.65
	Enclave Seco del Río Dagua	8,509.33
	La Empalada	10,560.80
	Parque Nacional Natural Farallones de Cali	220,153.48
	Parque Nacional Natural Tatamá	59,414.17
	Parque Natural Regional Páramo del Duende	32,136.29
	Región del Alto Calima	21,917.65
	Serranía de los Paraguas	259,592.27
	Serranía del Pinche	4,870.40
Awá-Cotacachi-Illinizas (Colombia-Ecuador)	**Corridor priority KBA area**	**1,081,787.13**
	Reserva Natural El Pangán	7,726.93
	Reserva Natural La Planada	4,519.83
	Reserva Natural Río Ñambí	8,595.15
	Bosque Protector Los Cedros	5,619.44
	Corredor Awacachi	16,668.80
	Intag-Toisán	63,884.53

	Los Bancos - Milpe	3,316.05
	Maquipucuna-Río Guayllabamba	21,069.58
	Mashpi-Pachijal	39,525.55
	Mindo and Western Foothills of the Pichincha Volcano	94,710.22
	Reserva Ecológica Cotacachi-Cayapas	361,615.47
	Los Illinizas Ecological Reserve and surroundings	169,316.06
	Río Caoní	9,101.37
	Río Toachi-Chiriboga	71,188.00
	Awá Ethnic Territory and surroundings	204,930.15
Northwest (Ecuador)	**Corridor priority KBA area**	**287,301.18**
	Cordillera de Huacamayos-San Isidro-Sierra Azul	169,316.06
	Parque Nacional Sumaco-Napo Galeras	217,629.87
Sangay-Podocarpus (Ecuador)	**Corridor priority KBA area**	**310,691.47**
	1 km west of Loja	672.09
	Abra de Zamora	7,833.86
	Acanamá-Guashapamba-Aguirre	1,994.67
	Alrededores de Amaluza	109,051.44
	Bosque Protector Moya-Molón	12,376.49
	Gualaceo - Limón Indanza	20,315.81
	Montañas de Zapote-Najda	9,699.60
	Parque Nacional Podocarpus	142,945.61
	Reserva Tapichalaca	3,925.89
	Saraguro Las Antenas	1,876.24
Northeast of Peru (Peru)	**Corridor priority KBA area**	**261,935.82**
	Cordillera de Colán	134,874.13
	Moyobamba	91,527.42
	Río Utcubamba	35,534.28
Cordillera de Vilcanota (Peru)	**Corridor priority KBA area**	**298,864.95**
	6 km south of Ocobamba	76,568.58
	Abra Málaga-Vilcanota	31,083.45
	Kosñipata Carabaya	96,492.93
	Lagos Yanacocha	2,439.65
	Quincemil	58,324.08
	Río Azara	33,956.27
Madidi-Pilón Lajas-Cotapata (Bolivia)	**Corridor priority KBA area**	**974,895.62**
	Bosque de Polylepis de Taquesi	3,455.83
	Cotapata	227,549.41
	Parque Nacional y Área Natural de Manejo Integrado Cotapata	57,238.61
	Yungas Inferiores de Pilón Lajas	249,857.65
	Yungas Superiores de Apolobamba	436,794.12
Total	**Priority KBA Area**	**4,040,579,80**

The seven priority corridors share several attributes that make them excellent candidates for CEPF support.

Paraguas-Munchique/Bosques Montanos del Sur de Antioquia Corridor (Colombia). This corridor is a result of the northward extension of the previous Paraguas-Munchique Corridor of Phase II. It has 11 priority KBAs containing 53 threatened species (17 CR and 36 EN): 28 amphibians, 10 birds, seven plants, six fish, one mammal and one reptile. Among these species are the Cauca fishing snake (*Synophis plectovertebralis*, CR), endemic to the KBA of the same name, and the black-headed spider monkey (*Ateles fusciceps*, EN). The corridor is impacted by mining, agricultural expansion, colonization, illicit crops, and deforestation resulting from these activities. The corridor provides water to the cities of Cali, Palmira and smaller towns such as Yotoco. Opportunities exist to work with Navera Drua and Emberá indigenous communities.

Awá-Cotacachi-Illinizas Corridor (Colombia and Ecuador). This corridor contains 15 priority KBAs, which harbor 76 endangered species (13 CR and 63 EN), of which 33 are amphibians, 15 are plants, 14 are reptiles, seven are birds, five are mammals and two are fish. Opportunities exist to conserve the black and chestnut eagle (*Spizaetus isidori*, EN), glass frogs (*Centrolene ballux,* EN and *C. scirtetes*, EN), great green macaw (*Ara ambiguus*, EN) and the endemic plant to Ecuador *Puya hirtzii* (CR). The KBAs on the southern quadrant have medium to high levels of irrecoverable carbon storage. The water availability of its KBAs is high and very high, as they supply water to the cities of San Miguel de Ibarra and Otavalo, as well as to the surrounding agricultural regions. Other cities outside the hotspot, such as Esmeraldas and San Lorenzo, depend on the water resources of this corridor. The corridor has high food security values and offers excellent ecotourism services. However, the corridor is threatened by mining, illegal logging, agricultural expansion, hydrocarbons, cattle grazing, and illegal coca and poppy cultivation, which has presented grave security threats to Awá communities along the Ecuador – Colombia border. CEPF supported the Awá people in both countries to help conserve their territory and increase their security.

Northeastern Corridor (Ecuador). The corridor contains two priority KBAs that host 22 threatened species (2 CR and 20 EN), including 13 amphibians, four plants, three mammals, one reptile and one bird. These species include the colorful and endemic Peters's stubfoot toad (*Atelopus petersi*, EN). Its ecosystem services medium to high carbon storage. New to CEPF, the Northeastern Corridor is a high national priority for conservation funding.

Sangay-Podocarpus Corridor (Ecuador). The first legally established connectivity corridor in Ecuador, the Sangay-Podocarpus Corridor includes 10 prioritized KBAs that host 50 threatened species (13 CR and 37 EN), distributed among 20 amphibians, 20 plants, five reptiles, three birds and two mammals, and nine plants (including genus *Puya*). The Pale-headed brushfinch (*Atlapetes pallidiceps*, EN) is endemic to the arid low scrublands of southern Ecuador. The corridor's threat level is high due to mining and road expansion. It has high carbon storage and high water availability, which supplies water to the city of Loja. The corridor is inhabited by the Saraguro, Cañari and Shuar indigenous groups.

Northeastern Peru Corridor (Peru). The Northeastern Peru Corridor hosts three priority KBAs that harbor 16 threatened species (2 CR and 14 EN), of which five are birds, five are mammals, five are amphibians and one is a plant. These include the emblematic yellow-tailed woolly monkey (*Lagothrix flavicauda*, CR) and the Rio Mayo titi (*Plecturocebus oenananthe*, CR). Among the threats facing this corridor are mining, agricultural expansion and road development, that together generate a high level of threat. Its KBAs have medium to high levels of carbon storage. Attractions such as Gocta Waterfall (Peru's highest waterfall) and Kuélap's archaeological ruins attracted a growing albeit chaotic tourism sector prior to the pandemic. CEPF support to local communities enabled them to take advantage of growing interest in nature tourism. In addition, CI manages a successful conservation project in the Alto Mayo KBA, which is an excellent model for replication to link biodiversity with carbon financing.

Cordillera de Vilcanota Corridor (Peru). This corridor contains 16 threatened species (4 CR and 13 EN) in six prioritized KBAs: five birds, eight amphibians, two mammals and one fish. Among its mammals, the charismatic Andean mountain cat (*Leopardus jacobita*, EN) and the Peruvian spider monkey (*Ateles chamek*, EN) stand out. Its ecosystem services include water supply to the city of Cusco, medium to very high carbon storage in its KBAs, as well as tourism services to Machu Picchu and the Sacred Valley. The corridor has two oil pipelines and the Southern Inter-Oceanic Highway, connecting Peru and Brazil. Other prominent threats include mining, new roads, illicit crops and the expansion of the agricultural frontier. The corridor offers the opportunity to continue CEPF's collaboration with the Q'ero indigenous communities and to promote nature tourism.

Madidi-Pilón Lajas-Cotapata Corridor (Peru and Bolivia). This corridor contains five priority KBAs that together harbor 22 threatened species (6 CR and 16 EN): 10 plants, five amphibians, five birds, one mammal and one reptile. The royal cinclodes (*Cinclodes aricomae*, CR), with less than 250 adult individuals and three Critically Endangered amphibians of the genus *Microkayla* stand out. The main threats include mining, expansion of the agricultural frontier (including coca cultivation), and dam and road construction. Its ecosystem services include high carbon storage and water provisioning to numerous municipalities. The corridor provides opportunities to work with the Lecos, Tacana, Quechua, Aymara, Esse Eja, Chimane, Tsimane and Mosetene indigenous communities. CEPF has a long standing relationship in Pilon Lajas with the Tsimane and Mosetene people.

Priority species and taxa

To maximize CEPF's contribution to conserve globally significant biodiversity, the investment strategy calls for targeted interventions to safeguard the most globally threatened species, which include species categorized as Critically Endangered (CR) and Endangered (EN) as well as selected genera. CEPF seeks to enable investments for those globally threatened species whose conservation needs cannot be adequately met by general habitat protection alone. The profile shows that within the hotspot 1,451 species are globally threatened in the categories of Critically Endangered (CR), Endangered (EN) and Vulnerable (VU) (Table 5.1), of which 183 species are priorities for CEPF (see Table 13.3 and Appendix 13.3) based on their locations within priority corridors and KBAs. Amphibians are the most threatened taxonomic group according to assessments to date, due to habitat loss, pollution and chytrid fungus, resulting in the decline and extinction of amphibian populations. However, there are also other emblematic species such as the Cauca guan (*Penelope perspicax*), the Andean mountain cat (*Leopardus jacobita*), and yellow-tailed woolly monkey (*Lagothrix flavicauda*, CR), that merit directed conservation support as well. In Phase II, CEPF laid a solid foundation to conserve globally threatened species upon which build on for the next investment period. In addition, CEPF will respond to the high threat posed by wildlife trafficking and hunting in the conservation corridors and KBAs, which is a new area of engagement for the fund.

Table 13.3. Summary of Species Priorities for the Tropical Andes Hotspot

Taxonomic Group	**Number of species**
Amphibians	82
Birds	32
Mammals	11
Fish	7
Plants	41
Reptiles	10
Total	**183**

Figures 13.2. Priority KBAs and Corridors

Figure 13.2.i. Colombia

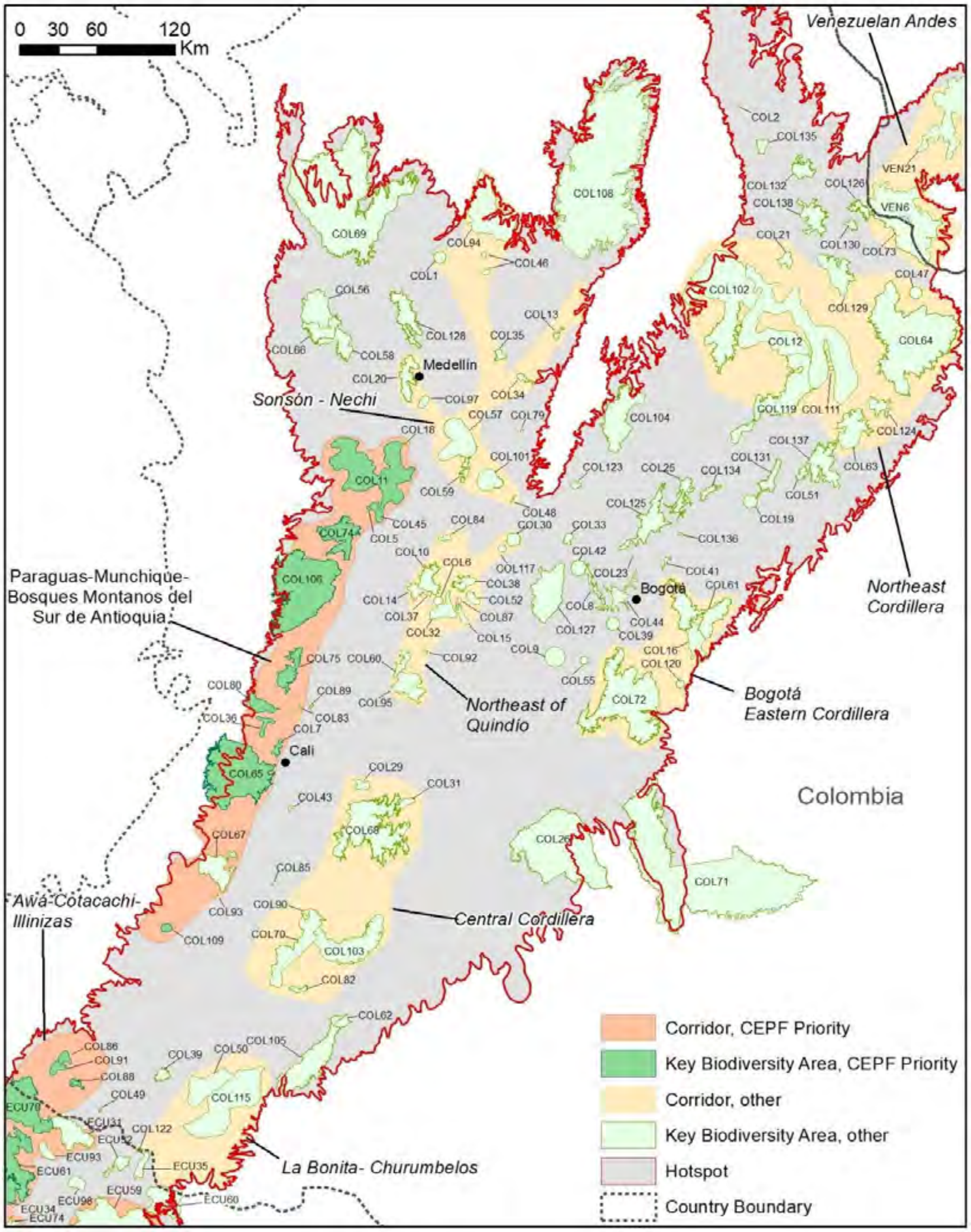


Figure 13.2.ii. Ecuador

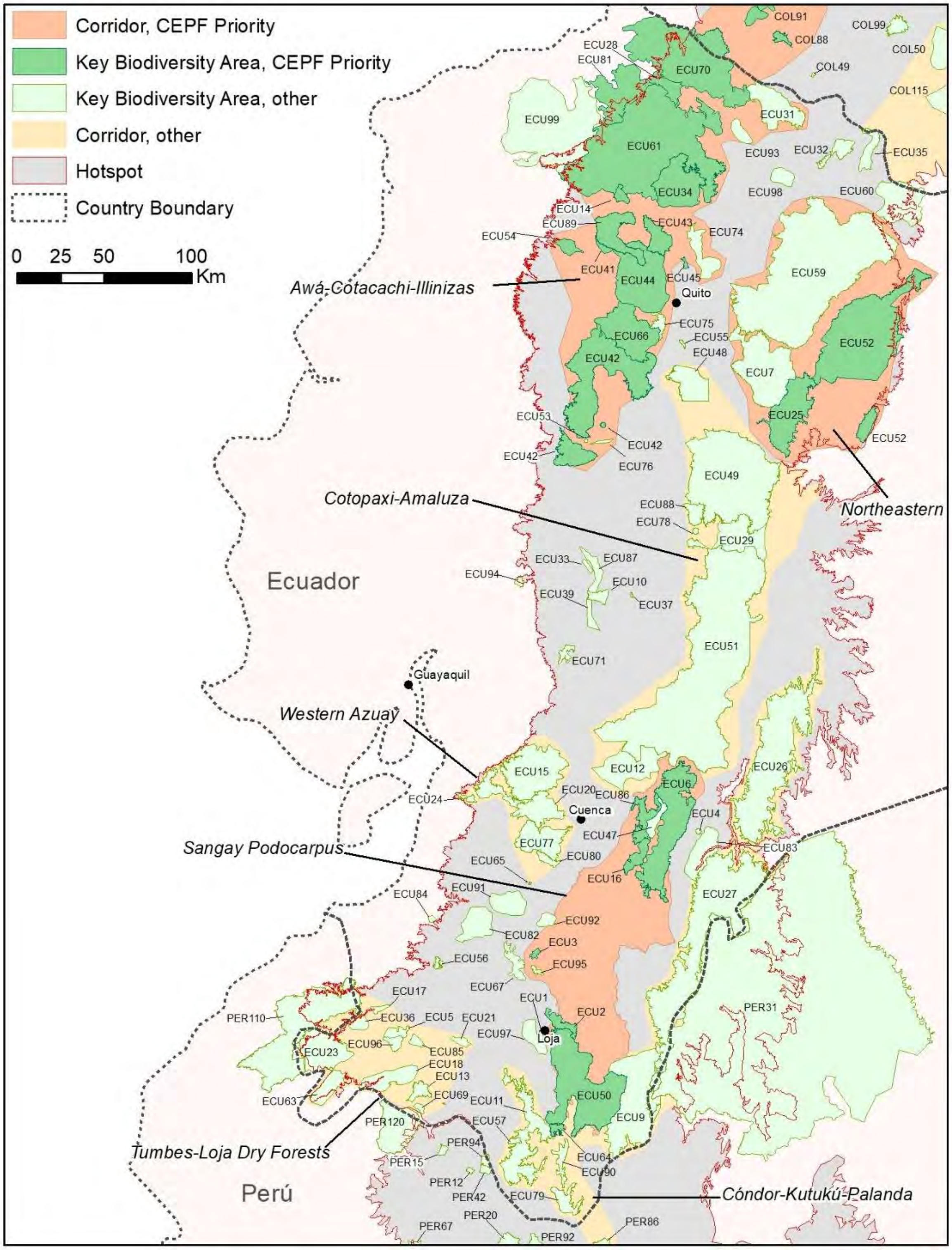


Figure 13.2.iii. Northern Peru

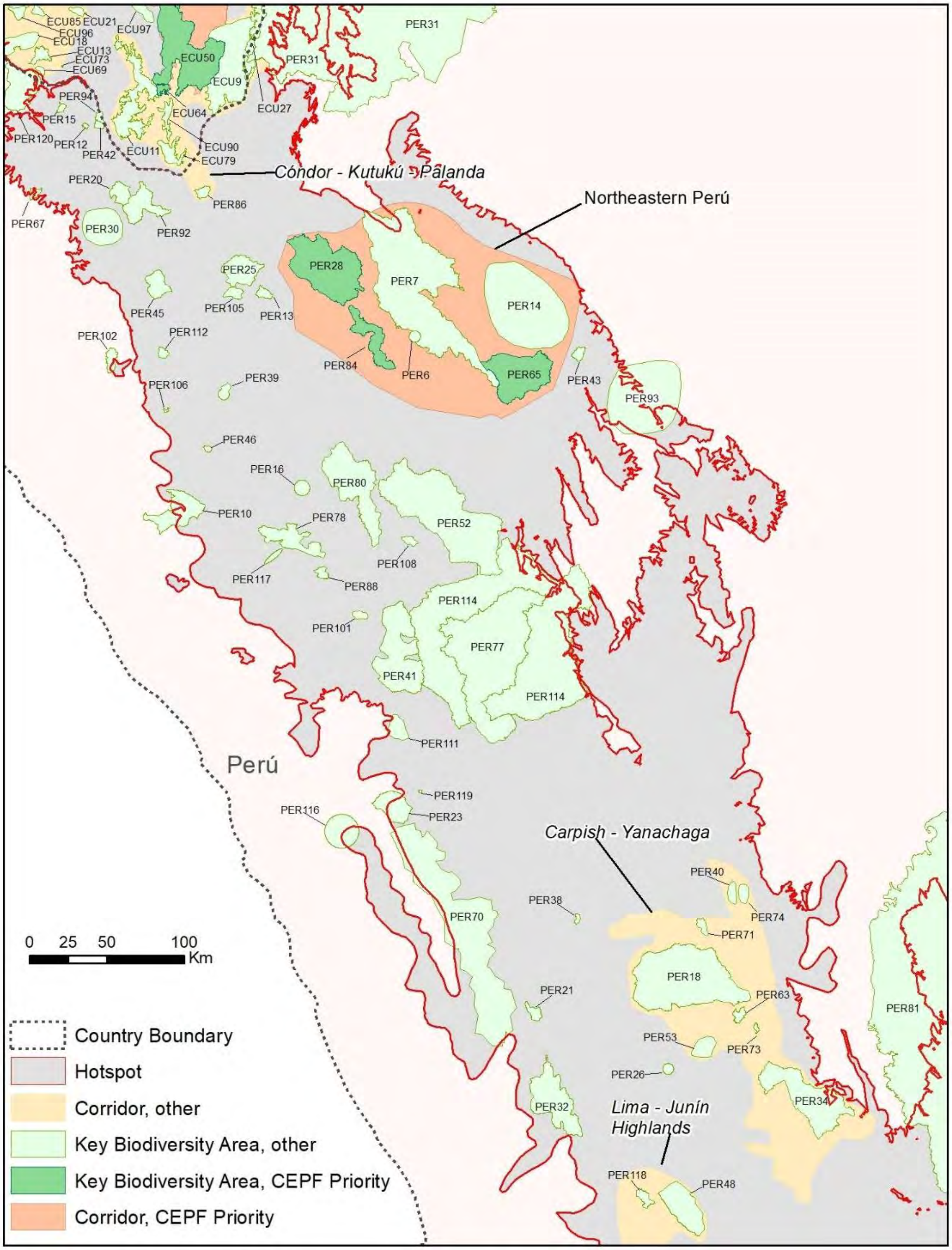
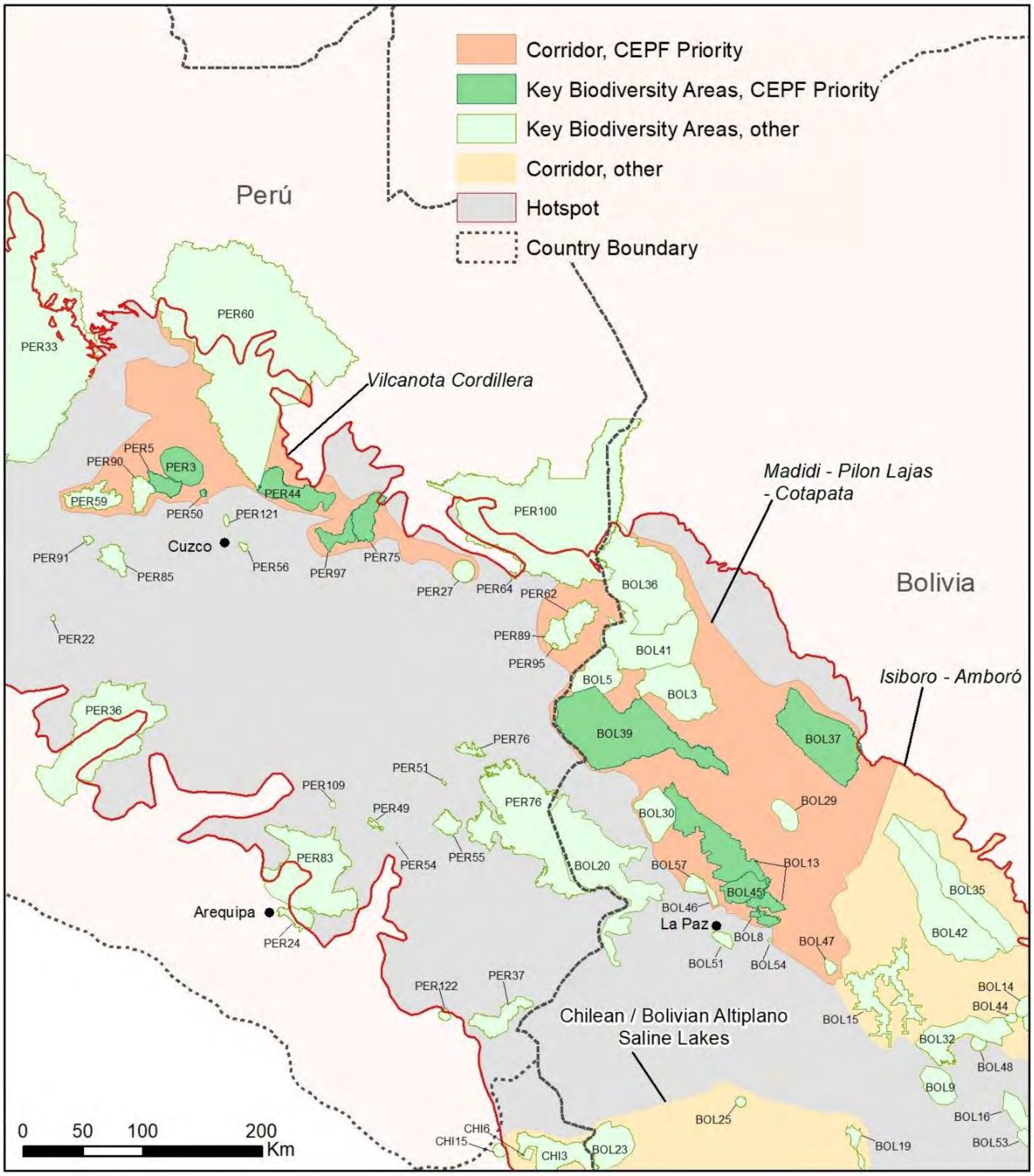


Figure 13.2.iv. Southern Peru and Bolivia



13.2 Strategic Directions and Investment Priorities

To respond to the current crisis and to address longstanding threats to biodiversity and their root causes, the Phase III investment strategy builds on the achievements and lessons learned from previous phases by supporting five strategic directions and 22 investment priorities, as presented in Table 13.4. The strategy seeks to address short-term conservation needs to stem environmental degradation resulting from the pandemic, through support to the most impacted communities and sites, strengthening land tenure for communities, encouraging sustainable livelihoods opportunities and stopping wildlife trafficking and hunting impacting the KBAs. The investment strategy also supports the long-term vision for the hotspot: to build local conservation capacity for civil society, secure more stable and diversified sources of funding, institutionalize conservation outcomes, and foster strong private sector engagement for conservation. Furthermore, the strategy emphasizes linkages between biodiversity conservation in the priority KBAs and corridors with the provision of vital ecosystem services, for water provisioning. Phase III fosters multi-sectoral collaboration between local communities, civil society, government, and the private sector by building on the multi-stakeholder alliances established and strengthened in previous investments.

The strategy adopts five cross-cutting themes regarded as essential to achieve CEPF's overall conservation objectives: 1) revival of COVID-19 impacted sites and economies based on green objectives; 2) mainstreaming of gender equality into conservation strategies and projects; 3) strengthening of capacities of indigenous peoples and local civil society; 4) fostering long-term financial sustainability; and 5) contributing to climate change adaptation and mitigation. CEPF will seek proposals that emphasis one or more of these themes.

The investment strategy is ambitious while also being realistic. The scale of the challenge ahead is more than CEPF by itself can support alone. For this reason, CEPF will support projects that demonstrate a high value for money and that demonstrate opportunities for leverage.

Table 13.4. CEPF Strategic Directions and Investment Priorities for the Tropical Andes Hotspot

Strategic Directions	**Investment Priorities**
1. Strengthen protection and management of 52 priority KBAs to foster participatory governance, green recovery from COVID-19, climate change resilience, species conservation, and financial sustainability.	1.1 Facilitate the establishment, upgrading, and/or expansion of public and private protected areas.
	1.2 Prepare and implement participatory management plans and other relevant KBA management instruments that support broad stakeholder collaboration.
	1.3 Strengthen land tenure, management, and governance of indigenous territories and campesino communities.
	1.4 Enable local communities to enter and remain in incentive programs that benefit biodiversity conservation.
	1.5 Promote and strengthen bio-enterprises that support biodiversity conservation and provide gender-equitable benefits to local communities.
2. In the seven priority corridors, collaborate with public and private sector stakeholders to enable biodiversity conservation, a green recovery from COVID-19, and environmental,	2.1 Support participatory land-use and development plans and governance frameworks to foster a shared vision of conservation and sustainable development to guide future investments.
	2.2 Support the preparation of policies, programs, and projects that foster biodiversity conservation, particularly at sub-national levels, and that leverage funding for their implementation.
	2.3 Support the dissemination and integration of the conservation outcomes (threatened species, KBAs and corridors) in the strategic plans and public policies of governments, donors, and the private sector.

financial, and social sustainability, in benefit of the priority KBAs.	2.4 Establish and strengthen traditional and innovative financial mechanisms and leverage financing initiatives for conservation, including payments for ecosystem services, carbon credits and compensation mechanisms.
	2.5 Promote and scale up bio-enterprises to benefit communities, biodiversity, connectivity and ecosystem services.
	2.6 Promote private sector actors and their associations to integrate conservation into their business practices and to implement corporate social responsibility policies and voluntary conservation commitments.
	2.7 Integrate biodiversity conservation objectives into policies and programs related to mining and infrastructure and promote related demonstration projects.
	2.8 Strengthen local capacity, facilitate public consultation, and support partnerships to implement mitigation measures (assess, avoid, mitigate and monitor impacts) in projects that present a risk to priority KBAs, with a focus on mining and infrastructure.
3. Safeguard priority globally threatened species.	3.1 Prepare, implement, and institutionalize conservation action plans that include climate change resilience for 183 Critically Endangered (CR) and Endangered (EN) species, and for select genera, presented in Appendix 13.3.
	3.2 Support strategies and information campaigns to combat illegal wildlife trafficking and hunting in the KBAs and conservation corridors.
4. Cultivate a well-trained, well-coordinated and resilient civil society sector at the local, corridor, and hotspot levels to achieve CEPF's conservation outcomes.	4.1 Strengthen the institutional capacities (administrative, financial, fundraising, communications, governance, and project management) of CEPF's strategic partners to implement biodiversity conservation programs.
	4.2 Strengthen the technical knowledge and skills of civil society through short-term courses to implement practical conservation actions based on an evaluation and training strategy.
	4.3 Support a security strategy and alliance to safeguard at-risk environmental and indigenous defenders.
	4.4 Strengthen the strategic communication capacity of the media and civil society networks to create conservation awareness among the public and decision makers.
	4.5 Strengthen the capacities and involvement of women in CEPF initiatives.
	4.6 Improve stakeholder cooperation and strengthen alliances, and foster information exchange and lessons learned.
5. In the hotspot, provide strategic leadership and effective coordination of CEPF investment through a regional implementation team (RIT).	5.1 Create a broad community of civil society groups working across institutional and geographic boundaries, to strengthen their capacities and promote their long-term resilience, to support CEPF's mission and conservation goals.

Strategic Direction 1. Strengthen protection and management of 52 priority KBAs to foster participatory governance, green recovery from COVID-19, climate change resilience, species conservation, and financial sustainability.

The protection and conservation of the KBAs lie at the heart of CEPF's strategy to conservation the hotspot's biodiversity. Important gains in improving KBA viability, protection and management were made through previous CEPF investments. In Phase III, 52 KBAs are prioritized for funding under this strategic direction, as listed in Table 13.1. CEPF achieved important conservation gains in Phase II; however, since the onset of the COVID-19 pandemic in March 2020, many of the conservation activities have been significantly restricted and, in most cases, they have been completely halted. During the early stages of Phase III, CEPF expects to assist in the reactivation of conservation initiatives that were frozen due to the pandemic restrictions.

The main objective of this direction is to consolidate and make sustainable the achievements obtained in Phase II, and to replicate the best practices in neighboring KBAs within the priority corridors to allow for landscape-scale conservation.

To improve the protection of KBAs in need, CEPF will focus on promoting the designation and/or expansion of protected areas and the protection of indigenous territories in unprotected KBAs to mitigate threats and stimulate local support for their conservation. In addition, management and governance capacity will be strengthened through participatory approaches to ensure that protected areas meet their conservation objectives. Consolidation and amplification of successful approaches undertaken in Phase II will be sought as part of a strategy to design governance structures that promote long-term resilient conservation. CEPF will also emphasize linkages between the conservation of the priority KBAs with the vital ecosystem services, including for water provisioning and as nature-based solutions to the climate crisis.

CEPF also recognizes that advancing secure land tenure of campesino and indigenous communities, particularly in light of new pressures on land and natural resources due to the COVID-19 pandemic, is fundamental to ensure the success of conservation and sustainable development initiatives. CEPF will therefore put a high priority on advancing secure land tenure in communities that play a strategic role in conserving the KBAs.

This strategic direction seeks to improve management in those KBAs that have demonstrated high need for investment. In the case of KBAs that received CEPF resources in the past, the aim will be to consolidate their management and protection by promoting governance mechanisms that integrate the conservation of endangered species, climate change goals, a green recovery from COVID-19, and financial sustainability to achieve the long-term resilience of these KBAs and the graduation of civil society organizations with respect to CEPF support

To strengthen the financial sustainability of conservation actions, CEPF will help link CSO financing with incentive programs for biodiversity conservation, for example through water funds or payments for environmental services. Special emphasis will be placed on strengthening the processes for consolidation and replication initiated in Phase II.

In the context of economic recovery, many ventures will require strengthening strategic alliances and productive linkages with the private sector. In this vein, CEPF will fund implementation and replication of pilot projects and support for marketing networks and initiatives to scale up products and services compatible with conservation in the KBAs.

Increasing and leveraging private sector participation and funding for biodiversity represents a key opportunity to support sustainable land-use practices.

Investment Priority 1.1. Facilitate the establishment, upgrading, and/or expansion of public and private protected areas.

This investment priority is based on analysis that shows that 35 of the 52 priority KBAs are only partially protected or completely unprotected (Table 13.5). Of the 4.0 million hectares that lie within the priority KBAs, 0.8 million hectares found in 14 KBAs are unprotected, while 1.45 million hectares found in 21 KBAs are only partially protected.

Table 13.5. CEPF Priority KBAs under Legal Protection in the Hotspot

	Protected[1]	**Partially Protected**	**Unprotected**	**Total**
Number, percentage of KBA	17 (32.7%)	21 (40.4%)	14 (26.9%)	52
Area of KBA (ha), percentage of total	1,741,056 (43%)	1,454,724.5 (36%)	844,799.3 (21%)	4,040,579.8

[1] Rating: Protected: >80 percent of the KBA overlaps with a protected area.
Partially: 10-80 percent overlap; Unprotected: <10 percent overlap.

This investment priority will aim to strengthen legal protection for the 35 priority KBAs listed in Table 13.6 that are currently unprotected or partially protected, and where conditions are conducive to strengthening their legal protection.

CEPF will support civil society efforts to advance the technical and legal processes to formalize the protected area status of these priority sites. CEPF will support a wide array of activities: stakeholder consultations, field data collection or administrative arrangements for private protected areas; declaration of new national, subnational, local, indigenous, or private protected areas; and setting up governance frameworks, including management plans and mechanisms for collaborative decision making (e.g., management committees mentioned in the previous priority) and other participatory management arrangements. Particular attention will be given to sites where there is already a prior commitment to advancing protection by local governments and stakeholders.

Table 13.6. Unprotected or Partially Protected CEPF Priority KBAs

#	**Country**	**CEPF Code**	**KBA**	**Area (has)**
1	Bolivia	BOL8	Bosque de Polylepis de Taquesi	3,455.83
2	Bolivia	BOL13	Cotapata	227,549.41
3	Colombia	COL5	Alto de Pisones	1,380.61
4	Colombia	COL7	Bosque de San Antonio Km 18	5,993.74
5	Colombia	COL11	Bosques Montanos del Sur de Antioquia	200,574.65

6	Colombia	COL36	Enclave Seco del Río Dagua	8,509.33
7	Colombia	COL45	La Empalada	10,560.8
8	Colombia	COL75	Parque Natural Regional Páramo del Duende	32,136.29
9	Colombia	COL80	Región del Alto Calima	21,917.65
10	Colombia	COL86	Reserva Natural El Pangán	7,726.93
11	Colombia	COL91	Reserva Natural Río Ñambí	8,595.15
12	Colombia	COL106	Serranía de los Paraguas	259,592.27
13	Colombia	COL109	Serranía del Pinche	4,870.4
14	Colombia	COL74	Parque Nacional Natural Tatamá	59,414.17
15	Ecuador	ECU3	Acanamá-Guashapamba-Aguirre	1,994.67
16	Ecuador	ECU6	Alrededores de Amaluza	109,051.44
17	Ecuador	ECU14	Bosque Protector Los Cedros	5,619.44
18	Ecuador	ECU16	Bosque Protector Moya-Molón	12,376.49
19	Ecuador	ECU28	Corredor Awacachi	16,668.8
20	Ecuador	ECU86	Gualaceo - Limón Indanza	20,315.81
21	Ecuador	ECU34	Intag-Toisán	63,884.53
22	Ecuador	ECU45	Montañas de Zapote-Najda	9,699.6
23	Ecuador	ECU61	Reserva Ecológica Cotacachi-Cayapas	361,615.47
24	Ecuador	ECU54	Río Caoní	9,101.37
25	Ecuador	ECU66	Río Toachi-Chiriboga	71,188
26	Ecuador	ECU70	Territorio étnico Awá y alrededores	204,930.15
27	Peru	PER3	6 km sur de Ocobamba	76,568.58
28	Peru	PER5	Abra Málaga-Vilcanota	31,083.45
29	Peru	PER28	Cordillera de Colán	134,874.13
30	Peru	PER44	Kosñipata Carabaya	96,492.93
31	Peru	PER50	Lagos Yanacocha	2,439.65
32	Peru	PER65	Moyobamba	91,527.42
33	Peru	PER75	Quincemil	58,324.08
34	Peru	PER97	Río Araza	33,956.27
35	Peru	PER84	Río Utcubamba	35,534.28

Investment Priority 1.2. Prepare and implement participatory management plans and other relevant KBA management instruments that support broad stakeholder collaboration.

CEPF will support civil society efforts to prepare or update management plans for priority sites. Special emphasis will be given to the development of plans that involve local communities and anticipate a role for CSOs and communities in the implementation process, for example, through co-management arrangements. These plans should ensure the adoption of the CEPF´s five cross-cutting strategic themes: 1) revival of COVID-19 impacted sites and economies based on green objectives; 2) mainstreaming of gender equality into conservation strategies; 3) strengthening of capacities of indigenous peoples and local civil society; 4) fostering long-term financial sustainability; and 5) contributing to climate change adaptation and mitigation.

For the 24 KBAs that previously received CEPF funding and that already have management plans, CEPF will support implementation of targeted strategies and actions that are geared toward improving management effectiveness and long-term sustainability, and that complement other priorities within the CEPF investment strategy. Special emphasis will be placed on consolidating the results achieved through previous investments, and building governance frameworks, for example, through the establishment of local management committees or community management schemes involving local stakeholder groups. Building sustainability, through development and implementation of long-term financial mechanisms will be encouraged. CEPF partners will monitor and evaluate the impact of management interventions to identify changes and trends over time, as well as to measure progress towards management goals under an adaptive approach.

For those KBAs that do not have management plans or that have outdated plans, CEPF will channel resources to help prepare updated management plans. Priority will be given to efforts that involve local communities and that reinforce a role of CSOs, for example, through co-management agreements. Involvement of environmental authorities and the private sector will be important for successful plan formulation. The plans should include management recommendations to conserve globally threatened species found within the KBA (see Appendix 13.4 for a complete list IUCN Red Listed species for each priority KBA), alignment with climate change mitigation and adaptation goals, recovery from COVID-19 impacts, and financial sustainability. A priority will be to leverage funds from local governments and other donors to serve as counterpart financing.

Where necessary to guide conservation planning and action, CEPF will support CSO efforts to fill critical gaps in knowledge and information, including highly targeted field surveys for selected sites and species, and preparation of community assessments or socioeconomic surveys.

Investment Priority 1.3. Strengthen land tenure, management, and governance of indigenous territories and campesino communities.

Some priority KBAs overlap with indigenous territories and most of them have within their border or buffer zones campesino communities that maintain a direct relationship with the natural areas as part of their livelihood strategies. Often, insecure land tenure hinders the participation of campesinos and indigenous peoples in conservation processes. Having secure land tenure is often an essential pre-condition for communities to engage meaningfully in conservation efforts. For indigenous communities of the Andes hotspot, the preparation and adoption of *planes de vida,* or life plans, serve as important tools toward their empowerment and development.

In addition, the panedemic has resulted in large-scale migration of people leaving their homes in the cities and returning to their ancestrial villages, putting new pressures on the KBAs and corridors. The implication is that those KBAs where communities do not have secure land tenure are vulnerable to encroachment. Without secure land tenure, livelihoods projects that offer longer-term community benefits will be harder to sustain.

To this end, an important priority within the strategy will be to support activities that help to clarify and secure land ownership regimes for campesino and indigenous communities (such as regularization, legalization, and resolution of land tenure conflicts), to assist with legal recognition of traditional territorial rights in support of conservation and sustainable development goals in priority KBAs. CEPF will also support development of *planes de vida* and leveraging funding for their implementation.

Investment Priority 1.4. Enable local communities to enter and remain in incentive programs that benefit biodiversity conservation.

CEPF recognizes the importance of incentivizing local communities to participate in conservation programs and ensuring tangible economic benefits that can be sustained into the long term. The Tropical Andes hosts several schemes that provide financial incentives to communities and landowners to conservation their resources, most notably, water funds or payments for environmental services. At times, however, communities are limited in their ability to apply for these programs or to maintain their eligibility. CEPF will facilitate processes for communities to apply for, receive and remain in conservation incentive programs. To expand the benefits of these initiatives. CEPF will support CSOs working with communities to enter and remain in these conservation incentive programs. Activities may include capacity building and management planning, as well as collaboration with public agencies responsible for these programs to facilitate community access.

Investment Priority 1.5. Promote and strengthen bio-enterprises that support biodiversity conservation and provide gender-equitable benefits to local communities.

Building from Phase II, CEPF will support small and medium-sized conservation enterprises that demonstrate linkages between conservation and the generation of environmentally sustainable sources of income for communities. CEPF will support CSOs to conceive, develop and implement ecologically sustainable and economically viable livelihood projects for communities and their organizations, such as initiatives that support nature tourism, conservation coffee and cacao.

These enterprises should demonstrate direct benefits from the conservation of biodiversity and/or demonstrate how the enterprise will reduce threats that directly impact a priority KBA. The identification and sharing of best practices for the development and scaling up of conservation enterprises will also be eligible for support, as will promotion of greater collaboration in vital areas, such as marketing. Co-funding and leveraging additional resources will be strongly encouraged.

CEPF recognizes that the ecotourism projects supported under Phase II may require support to adopt COVID-19 mitigation protocols and to enhance marketing and their tourism services as part of their recovery from COVID-19.

Strategic Direction 2. In the seven priority corridors, collaborate with public and private sector stakeholders to enable biodiversity conservation, a green recovery from COVID-19, and environmental, financial, and social sustainability, in benefit of the priority KBAs.

The 52 priority KBAs are linked by their locations in seven corridors, and by their dependence on ecosystem services and administrative linkages to governmental entities found beyond their borders. CEPF recognizes that pockets of protection and sustainable management within the KBAs do not necessarily mitigate against pressures in buffer zones nor maintain ecosystem functionality at a landscape-scale, particularly when the pressures to biodiversity originate in areas beyond the borders of a KBA.

In Phase II, CEPF worked with sub-national governments in six corridors to build their capacity and strengthen their conservation policies and programs. To mainstream conservation and sustainable development into sub-national policies, CEPF partners worked closely with local authorities to pass 52 local ordinances. In Bolivia, CEPF partners successfully engaged the mining sector to develop pilot projects and policies that integrated social and environmental safeguards into mining practices and policies. These examples demonstrated how CSOs can serve as trusted advisors to governments and the private sector to achieve positive results.

CSOs have increased their participation in recent years in public policy formulation related to territorial planning and sustainable use of natural resources at national, local and regional levels. Strengthening partnership between CSOs and subnational governments is particularly important since, under the hotspot's decentralized approach to environmental management, local governments often have lead authority for natural resources management. They view environmental CSOs as credible and trust technical advisors.

In Phase III, CEPF will build on these successes to collaborate with the public and private sectors to advance those enabling conditions required to promote conservation and sustainable development in seven conservation corridors that house the priority KBAs. CEPF will pay particular attention to supporting the development of public policies aimed at promoting green recovery that takes into consideration conservation and the adoption of social and environmental safeguards in development policies and specifically in mining and infrastructure projects. In addition, CEPF will highlight the importance of conserving the KBAs and corridors for their ecosystem services, particularly for water provisioning and as important sites to support nature-based solutions to climate change.

CEPF will help institutionalize the adoption of KBAs and globally Red Listed species as conservation planning tools within public sector agencies for determining national and subnational conservation outcomes and for supporting various management instruments. CEPF will also support the updating of KBA boundaries to ensure that CEPF and other donor investments are channeled strategically within the priority sites.

The seven priority corridors extend across productive landscapes within and outside of the priority KBAs, that encompass agricultural, mining, livestock and forestry land uses. This mosaic necessitates the inclusion of the private sector as key actors to bring about economic recovery based on environmentally sustainable principles. Several private sector actors are at the forefront of environmental sustainability and innovation, often motivated by their own social responsibility objectives. Voluntary private sector mechanisms (e.g., codes of conduct, protocols, standards and certifications) and market incentives for environmental sustainability are creating opportunities for more innovative private sector approaches for CEPF to support.

CEPF will strengthen the link between CSOs and the private sector interested in working in biodiversity conservation. Opportunities may include strengthening sustainable supply chains and forging strategic alliances with new commercial partners. CEPF will promote pilot projects, support for marketing networks and initiatives aimed at scaling up products and services compatible with conservation in priority KBAs. Increasing and leveraging private sector participation and funding for biodiversity represent key opportunities to support sustainable land use.

Investment Priority 2.1. Support participatory land-use and development plans and governance frameworks to foster a shared vision of conservation and sustainable development to guide future investments.

Poor land-use planning and inappropriate agricultural, mining and infrastructure development are key contributors to the degradation of the hotspot. CEPF will build on its landscape-level work under its previous investments and will continue to support the planning and adoption of local and corridor-level land-use plans that create consensus by stakeholders on a long-term vision for conservation and development. CEPF will support CSOs working in a participatory manner through multi-stakeholder alliances with governments, the private sector, and other stakeholders to establish the planning and governance conditions necessary for landscape-scale conservation in the seven priority corridors. Activities may include providing strategic input in the preparation of land development and management plans (PDyOT by its acronym in Spanish), land-use and management plans (PUGS by its acronym in Spanish), and watershed management plans. CEPF will also support the alliances by which these planning frameworks will be implemented.

CEPF will also fund corridor-level action plans that seek to integrate the various conservation initiatives and projects implemented within the corridors within a coherent, corridor-level conservation action plan.

CEPF will support public instruments that leverage new funding to implement these plans and associated projects. In addition, CEPF will support the formation and maintenance of alliances and needed training to facilitate dialogue and implementation. CEPF may also assist in the design of supporting legal mechanisms, such as ordinances or decrees, that formalize commitments.

Investment Priority 2.2. Support the preparation of policies, programs, and projects that foster biodiversity conservation, particularly at sub-national levels, and that leverage funding for their implementation.

Development programs that depend on environmental quality (e.g., water resource management, climate change, natural disaster prevention, agriculture and public health) offer opportunities to create synergies and leverage the benefits of biodiversity in generating human well-being. To forge stronger links between biodiversity conservation and development programs, CEPF will fund activities dedicated to mainstreaming biodiversity considerations into public initiatives linked to land use in the priority corridors, particularly at sub-national levels. Activities may include technical analysis and assistance, stakeholder consultations, capacity building, and strategy formulation dedicated to mainstreaming conservation objectives into sub-national development policies. Focal areas may include COVID-19 recovery, climate change adaption and mitigation, water resources management, agricultural development, tourism promotion, mining, public health, and finance. Grants may focus on raising awareness among decision makers and donors regarding the substantial and cost-effective benefits of biodiversity and ecosystem services vital for economic development, human well-being and climate change risk mitigation.

Investment Priority 2.3. Support the dissemination and integration of the conservation outcomes (threatened species, KBAs and corridors) in the strategic plans and public policies of governments, donors, and the private sector.

CEPF's experience in Phase II revealed that the hotspot's governments, private sector, and local donor representatives are unaware of the Tropical Andes hotspot's importance to global conservation. They are unfamiliar with KBAs and the Global Red List as the global standard for conservation priority setting. In addition, a critical mass of KBAs is in dire need of having their boundaries updated. With the passage of time, new information has become available, and KBAs have undergone transformational changes. CEPF and other donors have found that the KBA delineations of 2014 are outdated, and their effectiveness for conservation priority-setting is diminished.

To ensure the long-term sustainability of CEPF's conservation outcomes, the use of KBAs and globally threatened species for conservation planning and implementation must be adopted and institutionalized by local governments and donors. This investment priority will therefore support KBA updating, particularly of outdated boundaries. Subsequently, CEPF will support the dissemination of the conservation outcomes through a communication campaign aimed at strategic actors, with the goal of integrating the conservation outcomes as priorities within local public policies and donor agendas. CEPF will emphasize leveraging of co-funding to implement this investment priority.

Investment Priority 2.4. Establish and strengthen traditional and innovative financial mechanisms and leverage financing initiatives for conservation, including payments for ecosystem services, carbon credits and compensation mechanisms.

A core objective of the Tropical Andes long-term vision is to promote long-term funding mechanisms to finance the costs of maintaining biodiversity and ecosystem services, and to cover the core operating costs of environmental civil society groups, so that they are fully empowered to serve as effective local stewards of their critical ecosystems, as embodied in CEPF's mission.

Under this investment priority, CEPF will fund the development of sustainable funding feasibility studies, business plans and strategies to support promising sustainable funding schemes for conservation and ecosystem services projects dedicated to supporting the CEPF conservation outcomes. CEPF may also support business plans and fund raising strategies, payment for ecosystem services schemes, membership and philanthropy strategies, crowdfunding, and climate change mitigation and/or adaptation proposals. CEPF will support those initiatives that demonstrate interest from other strategic actors to collaborate in their development. It is important to note that CEPF funds cannot be used to capitalize trust funds.

Investment Priority 2.5. Promote and scale up bio-enterprises to benefit communities, biodiversity, connectivity and ecosystem services in the corridors to benefit priority KBAs.

CEPF will support civil society organizations working in multiple KBAs to develop ventures that offer direct conservation benefits, improve connectivity between KBAs, and/or respond in a direct way to a threat within a priority KBA. The focus will be on land uses that are both key drivers of biodiversity loss and important opportunities to enhance agroforestry systems such as coffee and cocoa. The focus will also include innovative conservation-based products and ventures that demonstrate social and economic benefits and strengthen resilience to climate change. Grants could support civil society organizations working with rural producers, associations or extension agencies to develop and disseminate technologies and best practices to include biodiversity conservation. CEPF could also help create voluntary commitments to sustainable production and improve access and market linkages for biodiversity-friendly products. This may include developing strategic plans to promote certain sustainable activities (such as ecotourism) for KBAs within an entire corridor, for example. CEPF will also support civil society organizations working with exemplary and promising ecotourism initiatives that include effective mechanisms linking profits and benefits to local communities.

Investment Priority 2.6. Promote private sector actors and their associations to integrate conservation into their business practices and to implement corporate social responsibility policies and voluntary conservation commitments.

CEPF will support civil society partners working directly with those strategic companies and industries and their associations that are present in the corridors and are committed to developing and complying with guidelines, standards and policies that include biodiversity objectives. Areas of particular interest could include agriculture, forestry and tourism.

CEPF will fund efforts to increase the awareness and understanding of business leaders and technical staff to incorporate biodiversity conservation considerations and opportunities. Activities eligible for CEPF funding include facilitating dialogue, disseminating successful approaches and best practices, and providing technical assistance in the application of best environmental practices. Among strategic industries, CEPF will support technical assistance to integrate biodiversity conservation into business and production practices, strategies and policies. All proposed activities must have a benefit for a priority KBA.

Investment Priority 2.7. Integrate biodiversity conservation objectives into policies and programs related to mining and infrastructure and promote related demonstration projects.

To help integrate biodiversity conservation considerations into program and project planning, CEPF will support technical assistance, including analysis to identify potential environmental and social impacts and costs/benefits of individual projects; and guidance to develop and disseminate best practices for integrating conservation considerations into the planning, implementation and monitoring of these projects. This may include guidance on different types of good environmental practices and national and international environmental certification (CEPF does not fund the certification itself). CEPF may also support dialogue and exchanges among stakeholders to ensure their participation in the development of such projects, policies, or programs.

Investment Priority 2.8. Strengthen local capacity, facilitate public consultation, and support partnerships to implement mitigation measures in projects that present a risk to priority KBAs, with a focus on mining and infrastructure.

Local communities and civil society organizations are important stakeholders that need detailed knowledge of the potential impacts of large development projects, as well as the expertise to engage constructively in the planning and implementation processes of these projects. CEPF will work with local civil society groups to play a meaningful role in the design, implementation and monitoring of projects that impact priority KBAs, their communities and ecosystems, with an emphasis on mining and infrastructure projects. Special importance will be given to ensuring the sustainability of these processes in order to contribute to the prevention and mitigation of negative impacts of projects that pose a risk to priority KBAs. Support will be given to such activities as capacity building, facilitating dialogues and partnerships between communities and other civil society actors to ensure robust community participation in the processes of designing projects and monitoring environmental and social impacts. Funds may be channeled to help local organizations to actively participate in environmental impact assessment processes, including the identification of potential impacts and negotiations to avoid and/or mitigate them. Ensuring that the provisions of participatory impact assessments are implemented and monitored during and after project construction will also be vital to avoid any unexpected impacts.

Strategic Direction 3. Safeguard priority globally threatened species.

The number of globally threatened species in the hotspot increased by 75 percent since the 2015 CEPF assessment, going from 814 to 1,451 threatened species. This is not only due to the assessment of new taxa, but also to persistent and increasing pressures on Andean flora and fauna.

In addition, Chapter 6 finds that illegal wildlife trade and hunting has become a significant threat in recent years in several priority KBAs, imperiling globally endangered amphibians, mammals, reptiles, birds and plants alike. The COVID-19 pandemic is suspected to be exacerbating the problem as migrants fleeing cities in search of livelihoods and food put more pressure on wildlife. Species subject to hunting and trade include the white-bellied spider monkey (*Ateles belzebuth,* EN), mountain tapir (*Tapirus pinchaque*, EN), Red-and-green macaw (*Ara chloropterus*), green iguana (*Iguana iguana),* poison dart frogs (*Dendrobatidae* spp.) and jaguar (*Panthera onca*), to name a few target species. While international conservation groups and donors are working nationally with authorities to increase governmental capacity, the scale of the threat is not matched by sufficient response at the site and corridor level in the hotspot. Given the links between the wildlife trade and the emergence of zoonotic diseases, reducing trade and consumption of wildlife in the hotspot will secure benefits not only to wildlife, but also mitigate the risk of future zoonotic diseases.

In Phase II, CEPF investments directly benefitted 73 globally threatened and endangered species and indirectly benefited 213 species, through a variety of actions, including the development and implementation of species conservation plans with significant community involvement; integration species conservation recommendations into protected areas management plans; inventories, monitoring plans, distribution maps; and the assessment of species presence, status, and habitats in the KBAs and corridors. This strategic direction builds on the important successes of Phase II investments by supporting conservation of those species that are among the most endangered in the hotspot. To date, CEPF has not funded projects related to illegal wildlife trade and hunting.

Investment Priority 3.1 Prepare, implement, and institutionalize conservation action plans that include climate change resilience for 183 critically endangered (CR) species and Endangered (EN), and for select genera, presented in Appendix 13.3.

CEPF will support the development, update and implementation of conservation plans focused on the 183 Critically Endangered (CR) or Endangered (EN) species that include climate change adaptation and financial sustainability goals and actions (Table 13.3 and Appendix 13.3). Species-level projects should proactively involve local communities through environmental education, engagement in field research, dissemination of field research, and site-based conservation actions, as a means of raising local appreciation for species conservation. Grantees should seek formal approval and adoption of species conservation plans by governments, local communities, universities, and the private sector as an avenue toward securing co-funding, building scientific capacity of upcoming biologists, and ensuring sustainability beyond CEPF funding. Activities may also support at risk genera were appropriate, such as for frailejones, puyas, and *Pristimantis,* found in Appendix 13.3.

Investment Priority 3.2 Support strategies and information campaigns to combat illegal wildlife trafficking and hunting in the KBAs and conservation corridors.

CEPF will support CSOs partnering with relevant existing projects and governmental agencies and initiatives to develop and implement strategies dedicated to stopping illegal wildlife trafficking and hunting of globally threatened species in the priority KBAs and corridors where the problem is most egregious. Such strategies may include raising awareness of the public and local governments of the importance of maintaining their wildlife populations and on enforcing relevant laws, generating of information and intelligence on the extent and nature of the problem in priority sites, providing alternative livelihoods to people who rely on the illegal trade and bushmeat hunting, advocating for legal and policy reforms, and supporting enforcement capacities of local government agencies and park guards.

Strategic Direction 4. Cultivate a highly-trained, well-coordinated and resilient civil society sector at the local, corridor, and hotspot levels to achieve CEPF's conservation outcomes.

The Tropical Andes long-term vision relies on the growth of a robust and effective environmental civil society sector and multi-sectoral partnerships to provide strategic leadership and technical guidance to direct environmental and development policy toward sustainability over the next 20 years. Vital to this objective is enhancing the capacity of Andean civil society at the local, national and hotspot levels.

CEPF has a successful track record of investment in CSO capacity building that has achieved valuable conservation results. However, technical, and institutional capacity gaps remain, suggesting the need to address continued attention to this priority. Strengthening collaboration with CSOs and other vital conservation partners is an important tool to optimize the resources invested in conservation. The objective of this strategic direction is to strengthen Andean CSOs through five investment priorities to achieve the conservation goals envisioned in this investment strategy and in the long-term hotspot vision. CEPF will also aim to engage in virtual platforms and capacity building efforts civil society groups working the in the hotspot KBAs and corridors of Argentina, Chile and Venezuela.

Investment Priority 4.1. Strengthen the institutional capacities (administrative, financial, fundraising, communications, governance, and project management) of CEPF's strategic partners to implement biodiversity conservation programs.

CEPF will support efforts to strengthen the institutional capacity of Andean conservation organizations that have an important role to play in achieving CEPF's strategic directions. Funds will be provided for comprehensive institutional capacity building packages. These packages will aim to develop the institutional capacity required to carry out biodiversity conservation. Special attention will be given to supporting sustainable fundraising and financing capacity.

Investment Priority 4.2. Strengthen the technical knowledge and skills of civil society through short-term courses to implement practical conservation actions based on an evaluation and training strategy.

Based on the achievements of previous training processes promoted by CEPF and the results of the Phase II evaluation, CEPF will support the design and implementation of capacity building plans and programs in the areas prioritized in this strategic direction, particularly short-term, virtual courses to benefit CEPF partners in the four portfolio countries. CEPF will focus on building capacity that helps sustain results carried out under the other strategic directions. Special attention will be given to technical capacity building for the formulation of projects related to climate change adaptation and mitigation, sustainable finances, COVID-19 recovery and sustainable enterprises. Virtual courses may include participants working in KBAs and corridors in Argentina, Chile and Venezuela.

Through this investment priority, CEPF will support participation in short-term training courses, exchanges, peer learning and mentorship. Support under this investment priority will dovetail with project implementation and will be provided for activities that are linked to a conservation goal. In keeping with global CEPF policy, support will not include funding for academic studies. At the start of the new phase, CEPF will commission a capacity-building needs assessment and strategy.

Investment Priority 4.3. Support a security strategy and alliance to safeguard at-risk environmental and indigenous defenders.

To support at-risk environmental and indigenous defenders, CEPF will fund the expansion of the security strategy developed for Colombian defenders to cover the entire hotspot. CEPF will fund the expansion of the Colombian environmental defenders alliance to attract a broad coalition of actors dedicated to supporting strategy implementation. Grants may assist with implementation of priority actions within the strategy, such as establishment and fund raising for an emergency fund, improved security measures for at-risk defenders, communication to raise public awareness of the problem, and outreach to national and international entities to improve security and protection of at-risk defenders in the KBAs. CEPF will not fund activites that correspond to security functions of governments.

Investment Priority 4.4. Strengthen the strategic communication capacity of the media and civil society networks to create conservation awareness among the public and decision makers.

To support CEPF grantees and the CEPF conservation outcomes, this investment priority calls for strengthening CSO communication capacities. The investment priority supports innovative approaches to communication, for example, through social media and the application of new information and communication technologies. Furthermore, CEPF seeks to build the capacities of national and local journalists to report on conservation, particularly on the species, KBAs and corridors. Funding will be available to foster partnerships with local media, environmental journalists, and public relations companies, and to create networks between CEPF partners and journalists covering KBAs, corridors and relevant thematic priorities.

Investment Priority 4.5. Strengthen the capacities and involvement of women in CEPF initiatives.

The ecosystem profile finds that women's participation in conservation is underrepresented and undervalued, even though women play a vital role in natural resources management throughout the hotspot. Based on the findings of the Phase II gender assessments of CEPF grantees, this investment priority calls for financing grants aimed at strengthening women's strategic involvement in conservation initiatives in the prioritized KBAs and corridors. Activities may include capacity building to promote opportunities for women engagement in CEPF projects, development and implementation of gender policies, and promoting women's empowerment in decision-making processes. For more information, consult the Gender Toolkit on the CEPF website.

Investment Priority 4.6. Improve stakeholder cooperation and strengthen alliances and foster information exchange and lessons learned.

In Phase II, CEPF facilitated peer-to-peer exchanges at corridor, national and regional levels, to support knowledge-sharing and provide a space for genuine relationship building. CEPF partners valued their ability to share lessons and information across a broad array of topics, which engendered a true spirit of partnership among participating organizations. In consultations to develop this investment strategy, Andean CSOs demonstrated strong interest in receiving funding to continue building on the partnerships and learning networks established in Phase II.

Under this investment priority, CEPF will continue to support alliances and collaborations. Investments may focus on new approaches (e.g., informal and formal networks and alliances, collaborative action and learning, and the use of social media, apps and online technology) to build capacity and cooperation in strategic areas of importance, including nature tourism, sustainable financing and fund raising, mining development, climate change, communications, species and site conservation, and policy and legislation. CEPF funds will support projects that stimulate learning and catalyze conservation action by civil society actors and will focus on best practices relevant to the Andes and the specific barriers and challenges confronting CSOs. CEPF will seek to engage civil society groups working in KBAs and corridors in Argentina, Chile and Venezuela in opportunities for virtual networking and information exchange.

Strategic Direction 5. In the hotspot, provide strategic leadership and effective coordination of CEPF investment through a regional implementation team (RIT).

CEPF will support a regional implementation team (RIT) to translate ecosystem profile plans into a cohesive portfolio of grants in which the whole is more than the sum of its parts. Each RIT will consist of one or more CSOs active in conservation in the region. For example, a team could be a partnership of civil society groups or it could be a lead organization with a formal plan to involve others in overseeing implementation, for example, through an inclusive advisory committee. The RIT will operate in a transparent and open manner, in accordance with CEPF's mission and all provisions of CEPF's Operational Manual. Organizations that are members of the RIT will not be eligible to apply for other CEPF grants within the hotspot. Formal affiliate applications will be accepted from those organizations that have an independently operating board of directors, subject to additional external review.

Investment Priority 5.1. Create a broad community of civil society groups working across institutional and geographic boundaries, to strengthen their capacities and promote their long-term resilience, to support CEPF's mission and conservation goals.

The RIT will provide strategic leadership and local knowledge to form a broad community of civil society support groups working across institutional and political boundaries to achieve the conservation objectives outlined in the ecosystem profile and promote the resilience, or adaptive management capacity, of CSOs over the long term. The RIT will seek opportunities to include civil society groups from hotspot in Venezuela in capacity building and networking efforts, particularly in virtual efforts. The main functions and specific activities of the team will be based on the approved terms of reference. The main functions of the team will be:

- Coordinate CEPF investments in the hotspot.
- Support the integration of biodiversity into public policies and private sector business practices.
- Communicate the CEPF investment throughout the hotspot.
- Contribute to the development of civil society capacities.
- Support the operation of the CEPF Secretariat in the solicitation and review of proposals for large grants.
- Administer a small grants program in accordance with CEPF's operating manual.
- Monitor and evaluate the impact of large and small grants.
- Support the CEPF Secretariat in monitoring the large grant portfolio and ensuring compliance with CEPF funding terms.

14. LOGICAL FRAMEWORK

Table 14.1 Logical Framework for CEPF Investment in the Tropical Andes Biodiversity Hotspot

Portfolio 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.	At least 60 CSOs, including at least 50 domestic organizations, actively participate in conservation actions guided by the ecosystem profile. At least 2.0 million hectares have new or strengthen management in 30 priority KBAs. At least 250,000 hectares of production landscapes with strengthened management of biodiversity. At least 50 alliances and networks formed among civil society actors to avoid duplication of effort and maximize impact in support of the CEPF ecosystem profile. At least 3 corridor development plans or policies integrate biodiversity conservation goals. At least five sustainable funding mechanisms established or strengthened, to leverage US$1.0 million in sustainable funding for the conservation outcomes. At least 5,000 women and 5,000 of men receive direct socioeconomic benefits through increased income, food security, resource rights or other measures of human wellbeing. At least eight indigenous and/or Afro-descendant territories and their communities under improved land management and governance.	Grantee and RIT progress reports Annual portfolio overview reports; portfolio mid-term and final assessment Protected Areas Tracking Tool (SP1 METT)	COVID-19 restrictions on travel and meetings do not significantly limit conservation action in the KBAs and corridors. Social, economic and political stability facilitate implementation of conservation initiatives and provide a safe operating environment for civil society. The CEPF grants portfolio effectively guide and coordinate conservation action in the Tropical Andes Hotspot. Stakeholder interests remain stable or increase with respect to working in partnership with CSOs to achieve the CEPF conservation outcomes. Regulatory and institutional environment for conservation, environmental protection, and civil society engagement remains stable or improves. Investments by other donors support complementary activities that reduce threats to priority corridors, sites and species and improve the operating environment for civil society.

	At least 200 communities, totalling at least 12,500 people, receive non-cash benefits from the management of their biological resources.		
Intermediate Outcomes	**Intermediate Targets**	**Means of Verification**	**Important Assumptions**
Outcome 1: Strengthen protection and management of 52 priority KBAs to foster participatory governance, green recovery from COVID-19, climate change resilience, species conservation, and financial sustainability. **US$6,500,000**	At least 6 unprotected or partially protected KBAs, covering at least 300,000 hectares, under new or expanded protection. At least 15 protected areas experience, on average, an improvement of at least 10 points in their METT score. 15 protected areas experience a 10% improvement in their participatory management, based on performance in questions 22 to 25 of the METT. Co-management mechanisms that enable community participation in site management and governance developed and/or strengthened for at least 5 KBAs. Climate change resilience integrated into 100% of KBA-level management plans and related management instruments. 10 *planes de vida* prepared and/or updated as development and empowerment plans for indigenous communities. 6 KBAs with improved indigenous and campesino land tenure. At least 15 KBAs support successful small and medium-level conservation enterprises with gender-equitable sustainable livelihoods for communities. In at least 5 KBAs, 30 communities receive cash benefits from incentive schemes for the effective management of biodiversity.	Grantee and RIT progress reports CEPF Secretariat supervision mission reports Protected Area Management Effectiveness Tracking Tool (SP1 METT) Formal legal declarations or community agreements designating new protected areas Management plans and reports on management activities Monitoring reports linked to incentive programs and bio-enterprises with gender-equitable benefits to local communities. World Database of KBAs Third-party impact evaluation reports.	Government agencies are supportive of civil society efforts to conserve KBAs and corridors. Protected area managers are receptive to involving local communities in zoning, management and governance. Local communities are willing to play an active role in site-based conservation. Indigenous and campesino communities are receptive to form alliances with CSO to improve land tenure. Government policies provide for community management of natural resources. CSOs have adequate capacity and are interested in engaging in conservation and management of KBAs and corridors. Suitable and sufficient funding sources are available for conservation incentives models. Appropriate, cost-effective site-based monitoring protocols for biodiversity and human wellbeing impacts can be developed.

Outcome 2: In the seven priority corridors, collaborate with public and private sector stakeholders to enable biodiversity conservation, a green recovery from COVID-19, and environmental, financial, and social sustainability, in benefit of the priority KBAs. **US$2,600,000**	At least 5 local development plans, projects, policies, and tools mainstream biodiversity, ecosystem services, and nature-based climate solutions, with a focus on tourism, mining, unsustainable agriculture, and infrastructure development. Climate change resilience integrated into 100% of sub-national development plans and policies supported by CEPF. At least five sub-national public entities in five priority corridors mainstream conservation tools and outcomes into their policies and operations. At least four sub-national governments in four corridors provide funding or in-kind support to CEPF-funded projects. Boundaries of KBAs in CEPF focal countries are updated, disseminated, and integrated into local and national public and donor conservation strategies. Long-term sustainable financing mechanisms in place for at least two CEPF priority KBAs and/or corridors. At least 10 conservation-friendly enterprises support local community monetary and/or non-monetary incentives for biodiversity in five corridors. At least 3 demonstration projects created and/or replicated with co-financing from the private sector, that integrate conservation, ecosystem services, and/or irrecoverable carbon into their production practices. At least two businesses and/or business associations influenced to better incorporate biodiversity, ecosystem services and irrecoverable carbon in their business and production practices, strategies, and policies in two corridors.	Grantee and RIT progress reports CEPF Secretariat supervision mission reports Official land-use and development plans and policies covering the priority corridors. Integrated management plans Subnational government reports and budgets for conservation in priority corridors. Private sector reports. Public-private partnership agreements	Decision-makers are receptive to working with CSOs and sympathetic to conservation and sustainable development of the priority KBAs and corridors. Private companies in key natural resource sectors appreciate the business case for better environmental and social practices. CSOs with sufficient capacity to engage in advocacy and decision-making. CSOs are committed to maintaining lines of collaboration and communication with the private sector. Suitable and sufficient funding sources will be available for conservation incentives models. Markets for sustainably produced commodities from the hotspot exist or can be built.

	At least three mining or infrastructure projects in two corridors integrate and co-finance social and environmental safeguards to prevent and/or mitigate environmental hazards in their operations. At least three mining or infrastructure projects in two corridors implement and finance monitoring protocols before and after their adoption of improved environmental and social practices.		
Outcome 3. Safeguard priority globally threatened species. **US$1,600,000**	Conservation attention focused on at least 50 globally Endangered and Critically Endangered species and/or their genera to improve their threat status. Conservation action plans developed, approved, and implemented for at least 20 priority Critically Endangered and Endangered species, with in-kind or monetary support provided by governmental and/or private sector entities to promote their sustainability after CEPF support. Action plans developed, approved, and implemented in two corridors to combat illegal wildlife trade and hunting, with in-kind or monetary support provided by governmental and/or private sector entities to promote their sustainability after CEPF support.	Grantee and RIT progress reports CEPF Secretariat supervision mission reports IUCN Red List species accounts Species conservation plans Strategic plans to combat illegal wildlife trade and hunting.	Adequate capacity to implement species-focused conservation exists among civil society or can be built. Governments and international donors remain committed to species conservation and are able to provide financial support for long-term programs. Innovative funding sources for species and site conservation (e.g. private companies, high net worth individuals, etc.) can be identified and accessed. National and international laws provide an appropriate basis for species-focused conservation action.

Outcome 4. Cultivate a highly-trained, well-coordinated and resilient civil society sector at the local, corridor and hotspot levels to achieve CEPF's conservation objectives. **US$1,200,000**	At least 80 percent of local CSOs demonstrate improved capacity and performance on their CSTT and GTT. 100 percent of CEPF projects working with communities incorporate gender considerations and capacity building to achieve gender equitable benefits. CSO sustainable financing strategies developed and implemented by at least 10 partners, leveraging at least US$100,000 in sustainable funding. At least 5,000 people, with 50 percent targeting women, receive structured training. One capacity needs assessment undertaken and implemented to support capacity building on priority conservation topics of direct relevance to implementation of the CEPF investment strategy. Baseline and final evaluation of virtual technical and administrative courses demonstrate improved capacity of at least 250 Andean conservation practitioners to implement conservation projects and secure new financing. A security strategy to reduce threats to at-risk environmental and indigenous defenders developed and promoted to attract a broad coalition to support strategy implementation. Five of media outlets (newspapers, radio and television stations, magazines) increase their capacity and coverage on the importance of biodiversity, ecosystem service values, and carbon stocks. At least 2 communication campaigns implemented to link the KBAs and their ecosystem services with climate resilience and human welfare.	Grantee and RIT progress reports and site visits CEPF Secretariat supervision mission reports CEPF's gender tracking tool CEPF's civil society organizational capacity tracking tool National and regional policy documents	The operating environment for civil society will remain constant or improve across the hotspot. Key capacity limitations of CSOs can be addressed through grant support. Civil society actors are able to work collaboratively to respond to conservation challenges. Key media outlets demonstrate interest in working with civil society to improve conservation reporting. Sufficient civil society capacity to undertake biodiversity mainstreaming exists or can be built.

	Awareness of local conservation issues and rights and opportunities related to natural resource management raised among local communities within at least 5 priority sites.		
Outcome 5. In the hotspot, provide strategic leadership and effective coordination of CEPF investment through a regional implementation team (RIT). **US$2,100,000**	At least 60 CSOs, including 50 domestic organizations, actively participate in conservation actions guided by the ecosystem profile. At least 20 CSOs leverage new funding to promote the sustainability of CEPF grants. At least 50 small grants and 50 large grants successfully achieve their main conservation objectives. At least 30 small grantees and 20 large grants consisting of grassroots and indigenous CSOs demonstrate improvements in their CSTT and GTT scores following CEPF support. One communication mechanism supported to enable active sharing of CEPF results, reports, best practices, and lessons learned among CSOs throughout the hotspot. At least one alliance of CEPF partners in each of the seven conservation corridors and/or focal countries coordinates their conservation and sustainable development projects to achieve synergies. At least 2 participatory assessments undertaken and lessons learned and best practices from the hotspot are documented and disseminated.	RIT progress reports CEPF Secretariat supervision missions and monitoring Post-project evaluation forms Civil society organizational capacity tracking tool	Qualified organizations will apply to serve as the RIT 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. CSOs will collaborate with each other, government agencies, and private sector actors in a coordinated regional conservation program in line with the ecosystem profile.
Total Budget:	**US$14,000,000**		

15. SUSTAINABILITY

Sustainability is a multi-dimensional concept with interrelated environmental, financial, social, and institutional elements that are all critical to achieving sustained conservation impact (Kammerbauer 2001). Sustainability is a continuous process of change and improvement towards a common goal: the use of natural resources, the direction of investments, the orientation of technological processes and the modification of institutions match the needs of present and future generations (WorldCommission on Environment and Development 1987).

To achieve this, sufficient and sustainable funding resources need to be allocated for conservation in the long term. It is also necessary to strengthen the organizational capacities of CSOs to generate greater impact and influence regulatory frameworks, governance systems, promotion of incentives and allocation of public budgets for conservation. All these elements are aligned with the long-term strategic vision of the Tropical Andes Biodiversity Hotspot, which defines lines of action for financial sustainability, CSO capacity building, the development of an enabling institutional and policy conditions, and conservation priorities and best practices.

CEPF links biodiversity conservation with the ecosystems and services provided by KBAs and their corridors, along with the well-being of the stakeholder present in these important biodiversity sites. With this in mind, CEPF will support activities in the Tropical Andes Biodiversity Hotspot over the next five years, seeking to guarantee long-term conservation outcomes and thus ensuring a positive and significant impact in the region. It will also seek to improve the enabling environment for conservation, including the policy and legal framework, governance, funding opportunities, and greater coherence around nature, conservation and ecosystem services.

Table 15.1 Sustainability and the CEPF Strategic Directions in the Tropical Andes Hotspot

Sustainability Element	Strategic Direction
Environmental Resilience	SD1. Strengthen protection and management of 52 priority KBAs to foster participatory governance, green recovery from COVID-19, climate change resilience, species conservation, and financial sustainability. SD2. In the seven priority corridors, collaborate with public and private sector stakeholders to enable biodiversity conservation, a green recovery from COVID-19, and environmental, financial, and social sustainability, in benefit of the priority KBAs. SD3. Safeguard 183 species designated as globally critically endangered (CR) and endangered (EN). SD5. In the hotspot, provide strategic leadership and effective coordination of CEPF investment through a regional implementation team (RIT).
Financial Sustainability	SD1. Strengthen protection and management of 52 priority KBAs to foster participatory governance, green recovery from COVID-19, climate change resilience, species conservation, and financial sustainability. SD2. In the seven priority corridors, collaborate with public and private sector stakeholders to enable biodiversity conservation, a green recovery from

	COVID-19, and environmental, financial, and social sustainability, in benefit of the priority KBAs. SD4. Cultivate a well-trained, well-coordinated and resilient civil society sector at the local, corridor, and hotspot levels to achieve CEPF's conservation outcomes.
Social Sustainability	SD1. Strengthen protection and management of 52 priority KBAs to foster participatory governance, green recovery from COVID-19, climate change resilience, species conservation, and financial sustainability. SD2. In the seven priority corridors, collaborate with public and private sector stakeholders to enable biodiversity conservation, a green recovery from COVID-19, and environmental, financial, and social sustainability, in benefit of the priority KBAs.
Civil Society Capacity	SD4. Cultivate a well-trained, well-coordinated and resilient civil society sector at the local, corridor, and hotspot levels to achieve CEPF's conservation outcomes.

Environmental Resilience

The investment strategy aims to strengthen ecosystem functionality and build resilience towards prioritized species, KBAs and corridors through the Strategic Directions 1, 2 and 3. Within the Tropical Andes Biodiversity Hotspot, it addresses the establishment and governance of protected areas and the development of management instruments in the prioritized KBAs, considering climate change management and the recovery from COVID-19 as cross-cutting elements. These elements are addressed through Strategic Directions 1, 2 and 3.

Financial Sustainability

CEPF will focus on opportunities whose financing can complement and create conditions for long-term financing, funding and commitments. The investment strategy promotes and strengthens bio-enterprises that support biodiversity conservation and generate benefits to local communities around KBAs and conservation corridors. The strategy emphasizes the development of innovative funding approaches, relying on payments for ecosystems services and carbon financing.

Furthermore, incentives for private sector participation will be actively promoted for the development of business practices, corporate social responsibility policies and voluntary commitments based on conservation. Additionally, the capacities of CSOs for fundraising and financial sustainability linked to biodiversity conservation will be strengthened. These aspects are addressed through Strategic Directions 1, 2 and 4.

Social Sustainability

With its focus on sustainable livelihoods, participatory management, environmental governance (public policies), and governance of indigenous and campesino communities, under Strategic Directions 1 and 2, the strategy ensures that the direct users of natural resources or beneficiaries derive benefits from conservation actions.

The elements addressed by these strategic directions promote integrated approaches for planning, management and land-use planning, through multi-stakeholder cooperation mechanisms, at the different governmental levels, and with the participation and cooperation of civil society and the private sector. A strong emphasis is placed on fostering participatory approaches to ensure strong local, multi-actor governance of the KBAs.

The inclusion of gender as a cross-cutting theme further supports social equity. Additionally, the strategy explicitly seeks to build a community of civil society groups, transcending institutional and geographical boundaries, to support conservation and increase understanding of the social and economic value of ecosystems and their services, through Strategic Directions 4 and 5.

Civil Society Capacity

The new phase of CEPF investment will build upon the important capacity gains made through previous investments, to continue to increase the capacity of NGOs and other CSOs based in the hotspot, to help address the economic crisis and recovery from the effects of the global health crisis. A major focus will be on supporting the diversification of funding sources toward securing long-term financing, particularly to cover core institutional costs.

Through Strategic Direction 4, CEPF will support CSOs to strengthen their technical and organizational capacities to implement biodiversity conservation programs and activities. It will also enhance CSOs' abilities to implement conservation actions and to improve their communication capacities to raise environmental awareness and reach out to decision-makers.

The Role of the RIT in Delivering Sustainability

The RIT’s contribution to the sustainability of the overall impact of the CEPF program encompasses grant selection and management, as well as establishing linkages between the program and government decision makers and regional processes.

Through its grant management, the RIT will contribute to sustainability, by considering each potential project’s relevance in the local political and cultural context, as well as alignment with national priorities and commitments under international conventions. Through its regional networking role, the RIT is expected to be aware of other funding opportunities and relevant programs, and to be proactive in ensuring that grantees are involved, including through sharing information on the CEPF program with other donors.

By helping facilitate linkages to government, the RIT will help grantees draw the attention of decision makers to the results and lessons learned from their projects, and demonstrate ways that they can contribute to government agendas. Where strategic opportunities to do so arise, the RIT will also support grantees in their outreach to private sector entities. The RIT will contribute to securing additional and continuing funding for projects initiated under the CEPF program, including working with partners on innovative financing mechanisms.

16. . REFERENCES

Abrahamczyk, S., Souto–Vilarós, D., and Renner, S.S. (2014). Escape from extreme specialization: passionflowers, bats and the sword–billed hummingbird. *Proceedings of the Royal Society B: Biological Sciences*, *281*(1795), 20140888.

Abuelafia, E. (2020). *Migración en la región andina: Impacto de la crisis y expectativas en el mediano plazo*. Banco Interamericano de Desarrollo (BID). Documento para discusión No. IDB-DP-0777.

Acosta–Galvis, A.R. (2015). Una nueva especie del género *Pristimantis* (Anura: Craugastoridae) del complejo de páramos Merchán–Iguaque (Boyacá, Colombia). *Biota Colombiana*, *16*(2), 107–127.

Agencia Peruana de Noticias Andina (2020). Accessed 10/11/2020. Available at: https://andina.pe/agencia/noticia-mas-25-millones-turistas-visitaron-las-areas-naturales-protegidas-del-peru-2019-786896.aspx#:~:text=Bicentennial-,M%C3%A1s%20of%202.5%20million%20of%20tourists%20visited%20the%20protected%20of%20Per%20Per%20C3%BA%20in%202019.

Aguilar, M.A., Calero, D., Cigarán, M.P., Chambi, C., Proaño, C., and Zevallos, P. (2019). *Avances en la acción climática de América Latina: Contribuciones nacionalmente determinadas al 2019*. Brussels: European Commission, EUROCLIMA+ Program. 171p.

Aguilar–Puntriano, C., Ramírez, C., Castillo, E., Mendoza, A., Vargas, V.J., and Sites, J.W. (2019). Three new lizard species of the *Liolaemus montanus* group from Perú. *Diversity*, *11*(9), 161–179.

Aguilar, C., Wood, P.L., Jr, Cusi, J.C., Guzmán, A., Huari, F., Lundberg, M., Mortensen, E., Ramírez, C., Robles, D., Suárez, J., Ticona, A., Vargas, V.J., Venegas, P.J., and Sites, J.W., Jr. (2013) Integrative taxonomy and preliminary assessment of species limits in the *Liolaemus walker* complex (Squamata, Liolaemidae) with descriptions of three new species from Peru. *ZooKeys 364*, 47–91.

Aguirre, C., Miranda, C., and Verhasselt, L. (2001). *Contribución al conocimiento del sistema del lago Titicaca*. Memorias del Simposio Internacional sobre el Sistema del Lago Titicaca. May of 2001. La Paz, Bolivia.

Albán, M. (2007). *Información disponible sobre los servicios de ecosistemas de montaña en los Andes del Norte y Centro*. Memorias del taller Servicios de ecosistemas de montaña en los Andes del Norte y Centro. Papallacta, Ecuador, October 2007. Challenge Programme for Water and Food Project.

Amador-Jiménez, M., Millner, N., Palmer, C. (2020). The Unintended Impact of Colombia's Covid-19 Lockdown on Forest Fires. Environ Resource *Econ* 76, 1081-1105. https://doi.org/10.1007/s10640-020-00501-5.

Anderson, E.P., Marengo, J.A., Villalba, R., Halloy, S.R., Young, B.E., Cordero, D., Gast, F., Jaimes, E., and Ruiz, D. (2012). Consecuencias del cambio climático en los ecosistemas y servicios ecosistémicos de los Andes Tropicales. En: S.K. Herzog, R. Martínez, P. Jorgensen, y H. Tiessen (Eds.). *Cambio climático y biodiversidad en los Andes Tropicales*. (pp. 1–22). Paris: IAI and SCOPE.

Andrade, A., Herrera, B., and Cazzolla, R. (eds.) (2010). *Building Resilience to Climate Change: Ecosystem-based adaptation and lessons from the field.* Gland, Switzerland: IUCN. 164 p.

Andrade, M. (Ed.). (2017). *Atlas. Clima y eventos extremos del Altiplano Central peruano–boliviano, 1981 – 2010*. La Paz y Lima: Servicio Nacional de Meteorología e Hidrología, Bolivia y Servicio Nacional de Meteorología e Hidrología, Peru.

Andrade–Pérez, G.I., Sandino, J.C., and Aldana–Domínguez, J. (2011). *Biodiversidad y territorio. Innovación para la gestión adaptativa frente al cambio global: insumos técnicos para el Plan Nacional para la Gestión Integral*

de la Biodiversidad y los Servicios Ecosistémicos. Bogota: Alexander Von Humboldt Institute. 64 p.
Angelsen, A., Brockhaus, M., Kanninen, M., Sills, E., Sunderlin, W.D., and Wertz–Kanounnikoff, S. (Eds.) 2010. *La implementación de REDD+: estrategia nacional y opciones de política*. Bogor, Indonesia: CIFOR.
Angelsen, A., Martius, C., de Sy, V., Duchelle, A.E., Larson, A.M., and Pham, T.T. (2019). *REDD+: la transformación – Lecciones y nuevas direcciones*. Bogor, Indonesia: CIFOR.
Anteparra, M., Berrios, M., Granado, L., and Díaz, W. (2018). Insectos polinizadores presentes de sacha inchi (*Plukenetia volubilis* L.) en el distrito de Chinchao, provincia de Huánuco. *Investigación y Amazonía*, *3*(2), 94–98.
Antonelli, A., Kissling, W.D., Flantua, S.G., Bermúdez, M.A., Mulch, A., Muellner–Riehl, A.N., Kreft, H., Linder, H.P., Badgley, C., Fjeldså, J., Fritz, S.A., Rahbek, C., Herman, F., Hooghiemstra, H., and Hoorn, C. (2018a). Geological and climatic influences on mountain biodiversity. *Nature Geoscience*, *11*(10), 718–725.
Antonelli, A., Zizka, A., Carvalho, F.A., Scharn, R., Bacon, C.D., Silvestro, D., and Condamine, F.L. (2018b). Amazonia is the primary source of Neotropical biodiversity. *Proceedings of the National Academy of Sciences*, *115*(23), 6034–6039.
Aparecido, L. M. T., Teodoro, G. S., Mosquera, G., Brum, M., Barros, F. D. V., Pompeu, P. V., ... and Asbjornsen, H. (2018). Ecohydrological drivers of Neotropical vegetation in montane ecosystems. *Ecohydrology*, *11*(3), e1932.
Aquino, R., García, G., Charpentier, E., y López, L. (2017). Estado de conservación de *Lagothrix flavicauda* y otros primates en bosques montanos de San Martín y Huánuco, Perú. *Revista Peruana de Biología*, *24*(1), 25–34.
Aquino, R., López, L., García, G., and Charpentier, E. (2015). Inventario y evaluación de primates y amenazas para sus poblaciones en bosque montano de la Región Huánuco, Perú. *Ciencia Amazónica*, *5*(1), 61–69.
Ariza-Montobbio, Pere et al. (2020). Ecosystem-based Adaptation in Ecuador: Good Practices for Adaptive Co-Management. Ambiente & Sociedade, 23, e03152. Epub August 03, 2020. https://dx.doi.org/10.1590/1809-4422asoc20180315r2vu2020l4ao
Armesto, L. O., and Señaris, J. C. (2017). Anuros del norte de los Andes: patrones de riqueza de especies y estado de conservación. *Papeis avulsos de zoologia*, *57*(39), 491-526.
Arteaga, A., Mebert, K., Valencia, J.H., Cisneros–Heredia, D.F., Peñafiel, N., Reyes–Puig, C., Vieira–Fernandes, J.L., and Guayasamín, J.M. (2017). Molecular phylogeny of *Atractus* (Serpentes, Dipsadidae), with emphasis on Ecuadorian species and the description of three new taxa. *ZooKeys, 661*, 91–123.
Arteaga, A., Salazar–Valenzuela, D., Mebert, K., Peñafiel, N., Aguiar, G., Sánchez–Nivicela, J.C., Pyron, R.A., Colston, T.J., Cisneros–Heredia, D.F., Yánez–Muñoz, M.H., Venegas, P.J., Guayasamín, J.M., and Torres–Carvajal, O. (2018). Systematics of South American snail–eating snakes (Serpentes, Dipsadini), with the description of five new species from Ecuador and Peru. ZooKeys*, 766*, 79–147.
Asturizaga, A.S., Øllgaard, B., and Balslev, H. (2006). Frutos comestibles. En: M. Moraes, B. Øllgaard, L.P. Kvist, F. Borchsenius and H. Balslev. (Eds.). *Botánica económica de los Andes Centrales.* (pp. 329–346). La Paz: Universidad Mayor de San Andrés.
Avendaño, J.E., Cuervo, A.M., López-O., J.P., Gutiérrez–Pinto, N., Cortés–Diago, A., and Cadena, C.D. (2015). A new species of tapaculo (Rhinocryptidae: *Scytalopus*) from the Serranía de Perijá of Colombia and Venezuela. *The Auk*, *132*(2), 450–466.
Avitabile, V., Herold, M., Heuvelink, G. B., Lewis, S. L., Phillips, O. L., Asner, G. P., ... and Berry, N. J. (2016). An integrated pan-tropical biomass map using multiple reference datasets. *Global change biology*, *22*(4), 1406-1420.

Bacon, C.D., Silvestro, D., Jaramillo, C., Tilston Smith, B.T., Chakrabarty, P., and Antonelli, A. (2015). Biological evidence supports an early and complex emergence of the Isthmus of Panama. *Proceedings of the National Academy of Sciences, PNAS 112*(19), 6110–6115

Báez, S., Jaramillo, L., Cuesta, F., and Donoso, D.A. (2016). Effects of climate change on Andean biodiversity: a synthesis of studies published until 2015. *Neotropical Biodiversity, 2*(1), 181–194.

Baguette, M., Blanchet, S., Legrand, D., Stevens, V. M., and Turlure, C. (2013). Individual dispersal, landscape connectivity and ecological networks. *Biological Reviews*, *88*(2), 310-326.

Baiker, J. (2011). *Guía ecoturística: Mancomunidad Saywite–Choquequirao–Ampay (Apurímac, Perú): con especial referencia a la identificación de fauna, flora, hongos y líquenes en el departamento de Apurímac y sitios adyacentes en el departamento de Cusco*. Lima: Ecobona Intercooperation Regional Programme. 968 p.

Barriga, R. (2012) Lista de peces de agua dulce e intermareales del Ecuador. *Politécnica, 30*, 83–119.

Bax, V., and Francesconi, W. (2019). Conservation gaps and priorities in the Tropical Andes biodiversity hotspot: Implications for the expansion of protected areas. *Journal of environmental management*, *232*, 387-396.

Bazoberry O. and Ruiz C. 2010. *¿Qué esperar de las ONG? enfoques y prácticas de desarrollo rural en los países andinos*. Quito-Ecuador. Editorial Abya Yala.

Beck, S.G., Hernandez, P.A., Jørgensen, P.M., Paniagua, L., Timaná, M., and Young, B.E. (2007). Vascular plants. En: B.E. Young (Ed.) *Endemic Species Distributions on the East Slope of the Andes in Peru and Bolivia*. (pp. 18 – 34). Arlington: NatureServe.

Benavides, J.C., D.H. Vitt and R.K. Wieder (2013). The influence of climate change on recent peat accumulation patterns of Distichia muscoides chushions bogs in
the high- elevation tropical Andes of Colombia. Journal of Geophysical.

Berenguel, R A., Elías, R.K., Weaver, T.J., and Reading, R.P. (2016). Chytrid fungus, *Batrachochytrium dendrobatidis*, in wild populations of the Lake Titicaca frog, Telmatobius culeus, in Peru. *Journal of Wildlife Diseases*, *52*(4), 973–975.

Beverinotti, B., Deza, M.C., and Manzano, O. (2020). *Productive sectors in the Andean region vis-à-vis COVID-19.* Inter-American Development Bank (IDB). Discussion Paper No. IDB-DP-00788. Available at: https://publications.iadb.org/publications/spanish/document/Los-sectores-productivos-en-la-region-andina-frente-a-la-COVID-19.pdf

BirdLife International and Conservation International. (2005). Áreas importantes para la conservación de las aves en las Andes Tropicales: Sitios prioritarios para la conservación de la biodiversidad. BirdLife Conservation Series Nº 14. Quito: BirdLife International.

BirdLife International. (2018). *Ara rubrogenys*. The IUCN Red List of Threatened Species 2018: e.T22685572A131382876.

BirdLife International. (2016a). *Grallaria ridgelyi*. The IUCN Red List of Threatened Species 2016: e.T22724628A94874688.

BirdLife International. (2016b). *Spizaetus isidori*. *The IUCN Red List of Threatened Species* 2016: e.T22696207A93549661.

BirdLife International. (2020a) Important Bird Areas factsheet: Parque Nacional Perijá. Retrieved from http://www.birdlife.org

BirdLife International. (2020b) Important Bird Areas factsheet: Parque Natural Regional Páramo del Duende. Retrieved from http://www.birdlife.org

BirdLife International. (2020c) Important Bird Areas factsheet: Selva de Florencia. Retrieved from http://www.birdlife.org

BirdLife International. (2020d) Important Bird Areas factsheet: Zona Protectora Macizo Montañoso del Turimiquire. Retrieved from http://www.birdlife.org

BirdLife International. (2020e) Important Bird Areas factsheet: Zona Protectora San Rafael de Guasare. Retrieved from http://www.birdlife.org
Bistend, M., Iyer, G., Edmonds, J., Vogt–Schilb, A., Arguello, R., Cadena, A., Delgado, R., Feijoo, F., Lucena, A.F.P., McJeon, H., Miralles–Wilhelm, F., and Sharma, A. (2019). *Implicaciones del Acuerdo de París sobre activos abandonados en América Latina y el Caribe*. IDB, Climate Change Division. Discussion Paper Nº IDB–DP–00699.
Blázquez, J., and Nuñez, M.N. (2013). Analysis of uncertainties in future climate projections for South America: comparison of WCRP–CMIP3 and WCRP–CMIP5 models. Climate Dynamics, *41*(3), 27–42.
BP (2019). Statistical Review of World Energy 2019 | 68Th edition
Bradley, R.S., Vuille, M., Díaz, H.F. and Vergara, W. (2006). Threats to water supplies in the tropical Andes. *Science 312*, 1755–1756.
Brezzi, M. and L. De Mello (2016). *Inequalities in Latin America: Trends and implications for growth.* Hacienda Pública Española, Vol. 219/4, pp. 93-120.
Brito, J., and Almendáriz, A. (2018). Una especie nueva de rana *Pristimantis* (Amphibia: Strabomantidae) de ojos rojos de la Cordillera de Cóndor, Ecuador. *Cuadernos de Herpetología, 32*(1), 31–40.
Brito, C. and Ivanovic, C. (2019). *Mujeres rurales, protección social y seguridad alimentaria en América Latina y el Caribe*. Serie 2030 – Alimentación, agricultura y desarrollo rural en América Latina y el Caribe, No. 23. FAO. Santiago de Chile.
Brown, J.L., Siu–Ting, K., Twomey, E., Guillory, W.X., Deutsch, M.S., and Chávez, G. (2019). Systematics of the *Ameerega rubriventris* complex (Anura: Dendrobatidae) with descriptions of two new cryptic species from the East-Andean versant of Peru. *Zootaxa*, *4712*(2), 211–235.
Bruijnzeel, L. A., Mulligan, M., and Scatena, F. N. (2011). Hydrometeorology of tropical montane cloud forests: emerging patterns. *Hydrological Processes*, *25*(3), 465-498.
Burgin, C.J., Colella, J.P., Kahn, P.L., and Upham, N.S. (2018). How many species of mammals are there? *Journal of Mammalogy*, *99*(1), 1–14.
Burney, D. A. and Flannery, T.F. (2005). Fifty millennia of catastrophic extinctions after human contact. *Trends in Ecology and Evolution 20*, 395–401.
Bush, M.B., Silman, M.R. and Urrego, D.H. (2004). 48,000 years of climate and forest change in a biodiversity hotspot. *Science, 303*, 827–829.
Bustos, E., Arnosio, J.M., and Norini, G. (2015). Análisis morfológico del complejo volcánico La Hoyada puna austral mediante la aplicación de modelos de elevación digital. *Revista de la Asociación Geológica Argentina, 72*(2), 279–291.
Buytaert, W. y B. de Bievre (2012). Water for cities: The impact of climate change and demographic growth in the tropical Andes. Water Resources Research 48: W08503.
BYOS- UASB (Consultora Soluciones Ambientales BYOS - Universidad Andina Simón Bolívar) (2020) Principales problemas ambientales del Hotspot Andes Tropicales. CEPF, Futuro Latinoamericano, PROFONANPE, Patrimonio Natual. Quito, October 2020.
Cala–Cala, P. (2019). *Medio ambiente y diversidad de los peces de agua dulce de Colombia*. Bogotá: Academia Colombiana de Ciencias Exactas, Físicas y Naturales. 525 p.
Campos, M. R., y Lasso, C. A. (2015). *Libro Rojo de cangrejos dulceacuícolas de Colombia*.
Cannatella, D.C. 2015. Review: Marsupial frogs: *Gastrotheca* and allied genera. *Phyllomedusa 14*, 167–170.
Cano, A., Delgado, A., Mendoza, W., Trinidad, H., Gonzáles, P., La Torre, M. I., Chanco, M., Aponte, H., Roque, J., Valencia, N., and Navarro, E. (2011). Flora y vegetación de suelos crioturbados y hábitats asociados en los alrededores

del abra Apacheta, Ayacucho-Huancavelica (Perú). *Revista Peruana de Biología*, *18*(2), 169–178.
Cano, A., Mendoza, W., Castillo, S., Morales, M., La Torre, M.I., Aponte, H., Delgado, A., Valencia, N. and Vega, N. (2010). Flora y vegetación de suelos crioturbados y hábitats asociados en la Cordillera Blanca, Ancash, Perú. *Revista Peruana de Biología*, *17*(1), 95–104.
Carlson, David C. (2001). *Scarabaeidae Latreille, 1802, Scarab beetles*. Retrieved from https://web.archive.org/web/20080629061156/http://www-museum.unl.edu/research/entomology/Guide/Scarabaeoidea/Scarabaeidae/Scarabaeidae-pages/Scarabaeidae-Overview/ScarabaeidaeO.html
Carrillo, J.D., Forasiepi, A., Jaramillo, C., and Sánchez–Villagra, M.R. (2015). Neotropical mammal diversity and the Great American Biotic Interchange: spatial and temporal variation in South America's fossil record. *Frontiers in Genetics, 5*(451), 1–11.
Carvajalino, A. (2018). Territorio e identidad en la Sierra Nevada de Santa Marta (Colombia). *Revista Latina de Sociología*, *8*(3), 94–112.
Castillo, L. S., C. A. Correa, C. L. Matallana Tobón , G. Corzo, A. Areiza , R. González-M., F. Serrano, L. Chalán Briceño , F. Sánchez Puertas, A. More, O. Franco, H. Bloomfield, V. L. Aguilera Orrury, C. Rivadeneira Canedo, V. Morón-Zambrano, E. Yerena, J. Papadakis, J. J. Cárdenas, R. E. Golden Kroner and O. Godínez-Gómez (2020) Connectivity of Protected Areas: Effect of Human Pressure and Subnational Contributions in the Ecoregions of Tropical Andean Countries.
Catenazzi, A., and Lehr, E. (2018). *Pristimantis antisuyu* sp. n. and *Pristimantis erythroinguinis* sp. n., two new species of terrestrial-breeding frogs (Anura, Strabomantidae) from the eastern slopes of the Andes in Manu National Park, Peru. *Zootaxa*, *4394*(2), 185–206.
Catenazzi, A., Lehr, E., Rodríguez, L.O., and Vredenburg, V.T. (2011). *Batrachochytrium dendrobatidis* and the collapse of anuran species richness and abundance in the upper Manu National Park, southeastern Peru. *Conservation Biology*, *25*(2), 382–391.
Catenazzi, A., and Ttito, A. (2016). A new species of *Psychrophrynella* (Amphibia, Anura, Craugastoridae) from the humid montane forests of Cusco, eastern slopes of the Peruvian Andes. *PeerJ*, *4*, e1807.
Catenazzi, A., and Ttito, A. (2019). *Noblella thiuni* sp. n., a new (singleton) species of minute terrestrial-breeding frog (Amphibia, Anura, Strabomantidae) from the montane forest of the Amazonian Andes of Puno, Peru. *PeerJ*, *7*, e6780.
Catenazzi, A., Uscapi, V., and von May, R. (2015). A new species of *Noblella* (Amphibia, Anura, Craugastoridae) from the humid montane forests of Cusco, Peru. *ZooKeys, 516*, 71–84.
Catenazzi, A., and von May, R. (2014). Conservation status of amphibians in Peru. *Herpetological Monographs*, *28*(1), 1–23.
Cerrón, J., del Castillo, J., Bonnesoeur, V., Peralvo, M., and Mathez–Stiefel, S.L. (2019). *Relación entre árboles, cobertura y uso de la tierra y servicios hidrológicos en los Andes Tropicales: Una síntesis del conocimiento*. Occasional Paper Nº 27. Lima: ICRAF and CONDESAN. 72 p.
CEPF (2015). *Ecosystem profile: Tropical Andes Biodiversity Hotspot*. Arlington. Critical Ecosystem Partnership Fund.
Chasiluisa, V.D., Caminer, M.A., Varela–Jaramillo, A. and Ron, S. (2020) Description and phylogenetic relationships of a new species of treefrog of the *Osteocephalus buckleyi* species group (Anura: Hylidae). *Neotropical Biodiversity, 6*(1), 21–36.
Chávez, G., Ayachi, L.A.G., and Catenazzi, A. (2020). A new species of frog (Terrarana, Strabomantidae, *Phrynopus*) from the Peruvian Andean grasslands. *PeerJ*, *8*, e9433.

Chávez, G., and Catenazzi, A. (2016). A new species of frog of the genus *Pristimantis* from Tingo María National Park, Huánuco Department, central Peru (Anura, Craugastoridae). *ZooKeys, 610*, 113–130.
Chávez, G., Catenazzi, A., and Venegas, P.J. (2017). A new species of arboreal microteiid lizard of the genus *Euspondylus* (Gymnophtalmidae: Cercosaurinae) from the Andean slopes of central Peru with comments on Peruvian *Euspondylus*. *Zootaxa*, *4350*(2), 301–316.
Chávez, G., Santa Cruz, R., Rodríguez, D., and Lehr, E. (2015). Two new species of frogs of the genus *Phrynopus* (Anura: Terrarana: Craugastoridae) from the Peruvian Andes. *Amphibian and Reptile Conservation*, *9*(1), 15–25.
Chero, J., Cruces, C., Iannacone, J., Sáez, G., Alvariño, L., Da Silva, R. J. and Morales, V. (2014). Parásitos gastrointestinales en tres especies de Telmatobius (Anura: Telmatobiidae) de la zona altoandina, Perú. *Neotropical helminthology*, *8*(2), 439–461.
Chesser, R.T., Isler, M.L., Cuervo, A.M., Cadena, C.D., Galen, S.C., Bergner, L.M., Fleischer, R.C., Bravo, G.A., Lane, D.F., and Hosner, P.A. (2020). Conservative plumage masks extraordinary phylogenetic diversity in the *Grallaria rufula* (Rufous Antpitta) complex of the humid Andes. *The Auk*, *137*(3), 1–25.
Chiriboga, M. (1995). Las ONGs y el Desarrollo Rural en los Países Andinos: Dilemas y Desafíos. En: *Ecuador Debate.* No. 35. p. 109-125. CAAP. Quito.
Cincotta, R.P., Wisnewski, J., and Engelman, R. (2000). Human population in the biodiversity hotspots. *Nature, 404*, 990–992.
Cione, A.L., Gasparini, G.M., Soibelzon, E., Soibelzon, L.H., and Tonni, E.P. (2015). *The great American biotic interchange: a South American perspective*. Netherlands: Springer. 97 p.
Cipriani, I., and Rivera, M. (2009). Detección de alcaloides en la piel de cuatro especies de anfibios ecuatorianos (Anura: Dendrobatidae). *Revista Ecuatoriana de Medicina y Ciencias Biológicas, 30*(1), 42–49.
Clapperton, C.M. (1993). *Quaternary geology and geomorphology of South America*. Amsterdam: Elsevier Press. 795 p.
Clerici, N., Armenteras,D., Kareiva, P. Botero, R., Ramírez-Delgado, J., Forero-Medina, G., Ochoa, J. Pedraza, C. Schneider, L. Lora, C.Gómez, C. Linares, M. Hirashiki & Biggs, D. (2020) Deforestation in Colombian protected areas increased during post-confict periods.
Coloma, L., Duellman, W., Almendáriz, A., Ron, S., Terán–Valdez, A., and Guayasamín, J. (2010). Five new (extinct?) species of *Atelopus* (Anura: Bufonidae) from Andean Colombia, Ecuador, and Peru. *Zootaxa 2574*, 1–54.
Coloma, L. E. (2016). Jambato negro del páramo, *Atelopus ignescens*, resucitó. *IMCiencia*.
Comer, P.J., Faber- Langendoen, D. (2013). Assessing ecological integrity of wetlands from national to local scales, exploring the predictive power and limitations of spacial models. No. 3 May/June 2013. National Wetlands Newsletter Special Issue on Wetland mapping and Assesment. Vol. 35. Enviromental Law Institute, Washington D.C.
Condori, F.P., Acevedo, A.A., Mamani, L., Delgado, J.A., and Chaparro, J.C. (2020). A new species of terrestrial-breeding frog of the genus *Psychrophrynella* (Anura: Strabomantidae) from the Cordillera de Vilcabamba, southeastern Peru. *Amphibian & Reptile Conservation*, *14*(3), 127–137.
Correa Ayram CA, Etter A, Díaz-Timoté J, Rodríguez Buriticá S, Ramírez W, Corzo G. (2020). Spatiotemporal evaluation of the human footprint in Colombia: Four decades of anthropic impact in highly biod iverse ecosystems. Ecological Indicators 117: 106630.
Cuesta, F., Peralvo, M., and Valarezo, N. (2009). *Los bosques montanos de los Andes Tropicales*. *Una evaluación regional de su estado de conservación y de su vulnerabilidad a efectos del cambio climático*. Research and

Systematization Series Nº 5. Quito: Regional Program ECOBONA-Intercooperation. 41 p.
Cuesta, F., Bustamante, M., Becerra, M.T., Postigo, J., and Peralvo, J. (Eds.) (2012a). *Panorama andino de cambio climático: Vulnerabilidad y adaptación en los Andes Tropicales*. Lima: CONDESAN, SGCAN.
Cuesta, F., Muriel, P., Beck, S., Meneses, R.I., Halloy, S., Salgado, S., Ortiz, E., and Becerra, M.T. (Eds.) (2012b). *Biodiversidad y cambio climático en los Andes Tropicales – Conformación de una red de investigación para monitorear sus impactos y delinear acciones de adaptación*. Lima and Quito: Gloria–Andes Network. 180 p.
Culliney, T.W. (2013). Role of arthropods in maintaining soil fertility. *Agriculture*, *3*(4), 629–659.
Cusi, J.C., Gagliardi, G., Brcko, I.C., Wake, D.B., and von May, R. (2020). Taxonomic status of the Neotropical salamanders *Bolitoglossa altamazonica* and *Bolitoglossa peruviana* (Amphibia: Caudata: Plethodontidae), with the description of a new species from Northern Peru. *Zootaxa, 4834*(3), 365–406.
Cusi, J.C., Moravec, J., Lehr, E., and Gvoždík, V. (2017). A new species of semiarboreal toad of the *Rhinella festae* group (Anura, Bufonidae) from the Cordillera Azul National Park, Peru. *ZooKeys, 673*, 21–47.
Cuvi, N. (2013). Los Andes tropicales. Donde conviven visiones plurales de la naturaleza. Nuevas historias ambientales de América Latina y el Caribe. *RCC Perspectives, 7*, 25–32.
Dammer, J. and Arellano, J. (ed). (2020). Gobernanza de las Industrias Extractivas en América Latina. Natural Resources Governance Institute. At: https://resourcegovernance.org/sites/default/files/documents/gobernanza-de-las-industrias-extractivas-en-america-latina-introductorio.pdf
Dantas, M., G. G. Figueroa, and A. Laguens (2014) Llamas in the Cornfield: Prehispanic Agro-Pastoral System in the Southern Andes. International Journal of Osteoarchaeology 24 (2): 149-65. https://doi.org/10.1002/oa.235
Devenish, C. and Gianella, C. 2012. 20 años de Desarrollo Sostenible en los Andes: de Río 1992 al 2012 y hacia el futuro CONDESAN/COSUDE, Lima. Duchicela, S. A., Cuesta, F., Pinto, E., Gosling, W. D., and Young, K. R. 2019. Indicators for assessing tropical alpine rehabilitation practices. Ecosphere, 10(2), [e02595]. https://doi.org/10.1002/ecs2.2595.
De Groot, R., Fisher, B., Christie, M., Aronson, J., Braat, L., Gowdy, J., Haines–Young, R., Maltby, E., Neuville, A., Polasky, S., Portela, R. and Ring, I. (2010). Integrating the ecological and economic dimensions in biodiversity and ecosystem service valuation. En: P. Kumar (Ed.). *The economics of ecosystems and biodiversity (TEEB)*. (pp. 149–172). London: The Ecological and Economics Foundations.
Del Popolo, F. (ed.) (2017). *Los pueblos indígenas en América (Abya Yala): desafíos para la igualdad en la diversidad*. Libros de la CEPAL, N° 151 (LC/PUB.2017/26), Santiago, Economic Commission for Latin America and the Caribbean (ECLAC), December.
De La Barra, E., Zubieta, J., Aguilera, G., Maldonado, M., Pouilly, M., and Oberdorff, T. (2016). ¿Qué factores determinan la distribución altitudinal de los peces de ríos tropicales andinos? *Revista de Biología Tropical*, *64*(1), 157–176.
De Munter, K., Trujillo, F., and Rocha, R. (2019). Atencionalidad y líneas de vida en la malla Poopó–uru–qotzuñi ("gente del agua"). *Antípoda, 34,* 19–40.
Doan, T.M., and Adams, G. (2015). A novel species of *Euspondylus* (Squamata: Gymnophthalmidae) from the Andes mountains of central Peru. *Zootaxa*, *4033*(1), 129–136.
Dourojeanni, M.J. (2019). Conservación de insectos en la Amazonia. *Ecología Aplicada*, *18*(2), 189–202.
Dourojeanni, M. (2016) Estudios de impacto ambiental y el área de influencia indirecta de las carreteras. Downloaded from:

https://www.actualidadambiental.pe/estudios-de-impacto-ambiental-y-el-area-de-influencia-indirecta-de-las-carreteras/
DoNascimiento, C., Herrera–Collazos, E.E., and Maldonado–Ocampo, J.A. (2018): Lista de especies de peces de agua dulce de Colombia / Checklist of the freshwater fishes of Colombia. v2.10. Colombian Association of Icthyologists. *Dataset/Checklist.* http://doi.org/10.15472/numrso
DoNascimiento, C., Herrera–Collazos, E.E., Herrera–R., G.A., Ortega–Lara, A., Villa–Navarro, F.A., Usma, J.S., and Maldonado–Ocampo, J.A. (2017). Checklist of the freshwater fishes of Colombia: a Darwin Core alternative to the updating problem. *ZooKeys*, (708), 25–138.
Duellman, W.E., Barley, A.J., and Venegas, P.J. (2014). Cryptic species diversity in marsupial frogs (Anura: Hemiphractidae: *Gastrotheca*) in the Andes of northern Peru. *Zootaxa*, *3768*(2), 159–177.
Duellman, W.E., and Venegas, P.J. (2016). Diversity of marsupial frogs (Anura: Hemiphractidae: *Gastrotheca*) in the northern Cordillera Central, Peru, with the descriptions of two new species. *Phyllomedusa*, *15*(2), 103–117.
Dupar, M. (2019). *El informe especial del IPCC sobre cambio climático y la Tierra: ¿Qué significa para América Latina?* Cape Town: Climate and Development Knowledge Network (CDKN), Overseas Development Institute (ODI), SouthSouthNorth (SSN) and Fundación Futuro Latinoamericano.
Dupar, M., and Pacha, M.J. (2020). *El informe especial del IPCC sobre el océano y la criósfera en un clima cambiante. ¿Qué significa para América Latina?* Cape Town: Climate and Development Knowledge Network (CDKN), Overseas Development Institute (ODI), Fundación Futuro Latinoamericano y SouthSouthNorth (SSN).
Dussaillant, I., Berthier, E., Brun, F., Masiokas, M., Hugonnet, R., Favier, V., Rabatel, A., Pitte, P., and Ruiz, L. (2019). Two decades of glacier mass loss along the Andes. *Nature Geoscience*, *12*(10), 802–808.
Echevarría, L., Barboza, A., and Venegas, P. (2015). A new species of montane gymnophthalmid lizard, genus *Cercosaura* (Squamata: Gymnophthalmidae), from the Amazon slope of northern Peru. *Amphibian & Reptile Conservation*, *9*(1), 34–44.
Echevarría, L.Y., and Venegas, P.J. (2015). A new elusive species of *Petracola* (Squamata: Gymnophthalmidae) from the Utcubamba basin in the Andes of northern Peru. *Amphibian & Reptile Conservation*, *9*, 26–33.
ECLAC (Economic Commission for Latin America and the Caribbean) (2019). *Derechos de los pueblos indígenas: marcos jurídicos e institucionales en los estados miembros del FILAC a diciembre de 2018.* Comisión Económica para América Latina y el Caribe, sobre la base de Fondo para el Desarrollo de los Pueblos Indígenas de América Latina y el Caribe (FILAC). Cuadernos de los Saberes, Nº 1, La Paz.
ECLAC (Economic Commission for Latin America and the Caribbean) (2020). *Dimensionar los efectos del COVID-19 para pensar en la reactivación*. Informe especial No. Comisión Económica para América Latina y el Caribe. Santiago.
ECLAC (Economic Commission for Latin America and the Caribbean) (2020). *Los pueblos indígenas de América Latina - Abya Yala y la Agenda 2030 para el Desarrollo Sostenible: tensiones y desafíos desde una perspectiva territorial*. Economic Commission for Latin America and the Caribbean (ECLAC)/Fund for the Development of Indigenous Peoples of Latin America and the Caribbean (FILAC). Project Documents (LC/TS.2020/47), Santiago, 2020.
ECLAC (Economic Commission for Latin America and the Caribbean) (2020). *La Inversión Extranjera Directa en América Latina y el Caribe, 2020.* Comisión Económica para América Latina y el Caribe. (LC/PUB.2020/15-P), Santiago 2020.
ECLAC, FAO and IICA. (2019). *Prospects for agriculture and rural development in the Americas: a look at Latin America and the Caribbean 2019-2020*. ECLAC, FAO, IICA. - San José, C.R.: IICA, 2019. 144 p.

ECLAC (Economic Commission for Latin America and the Caribbean), Prospects for International Trade in Latin America and the Caribbean, 2019 (LC/PUB.2019/20-P), Santiago, 2019. At: https://repositorio.cepal.org/bitstream/handle/11362/44918/7/S1900748_es.pdf
ECLAC (Economic Commission for Latin America and the Caribbean) (2020). Report on the economic impact of coronavirus disease (COVID-19) on Latin America and the Caribbean: Study prepared by the ECLAC. Santiago
Eisenberg, J.F., and Redford, K.H. (1989). *Mammals of the Neotropics, Volume 3: Ecuador, Bolivia, Brazil*. Chicago: University of Chicago Press.
El Comercio (Ecuador) (2019) Ecuador afronta una implacable lucha contra el tráfico de vida silvestre. Downloaded from https://www.elcomercio.com/tendencias/ecuador-lucha-trafico-animales-flora.html
El Comercio (Ecuador) (2020) La deforestación en Perú alcanzó 147,000 ha en 2019. Downloaded from: El Comercio (Ecuador) (2019). https://www.elcomercio.com/tendencias/deforestacion-peru-hectareas-2019-agriculture.html
El Tiempo (Colombia) (2019) Los problemas que enfrenta Colombia por el tráfico ilegal de animales. Downloaded from https://www.eltiempo.com/vida/medio-ambiente/problemas-para-colombia-por-el-trafico-ilegal-de-animales-402474
Engel, E. et al. (2018), Report of the Expert Advisory Group on Anti-Corruption, Transparency, and Integrity in Latin America and the Caribbean, Inter-American Development Bank, Washington D.C
Erdes, P. (2020). Carbon Budget Calculator. Retrieved from: https://carbonbudgetcalculator.com
Estado Plurinacional de Bolivia (2015). *Contribución prevista determinada nacionalmente del Estado Plurinacional de Bolivia*. La Paz.
Estado Plurinacional de Bolivia (2012). *Mecanismo conjunto de mitigación y adaptación para el manejo integral y sustentable de los bosques y la Madre Tierra*. La Paz: Ministerio de Relaciones Exteriores and Ministerio de Medio Ambiente y Agua.
Fadrique, B., Báez, S., Duque, A., Malizia, A., Blundo, C., Carilla, J., Osinaga–Acosta, O., Malizia, L., Silman, M., Farfán–Ríos, W., Malhi, Y., …, and Feeley, K.J. (2018). Widespread but heterogeneous responses of Andean forests to climate change. *Nature*, *564*(7735), 207–212.
FAO (2017). *Latin America and the Caribbean is the Region with the Greatest Inequality in the Distribution of Land*. Food and Agriculture Organization of the United Nations. Available at: http://www.fao.org/americas/noticias/ver/en/c/878998/
Feeley, K.J., Silman, M.R., Bush, M.B., Farfan, W., García, K., Malhi, Y., Meir, P., Salinas, N., Raurau, M.N., and Saatchi, S. (2011) Upslope migration of Andean trees. *Journal of Biogeography 38*, 783–791.
Ferguson-Lees, J., y Christie, D. A. (2001). *Raptors of the Ahoworld*. A&C Black.
FILAC (2019). *Derechos de los pueblos indígenas: marcos jurídicos e institucionales en los estados miembros del FILAC a diciembre de 2018.* Fondo para el Desarrollo de los Pueblos Indígenas de América Latina y el Caribe. Cuadernos de los Saberes, Nº 1, La Paz.
Fjeldså, J., Bowie, R.C. and Rahbek, C. (2012). The role of mountain ranges in the diversification of birds. *Annual Review of Ecology, Evolution, and Systematics*, *43*, 249–265.
Fjeldså, J., and Krabbe, N. (1990) *Birds of the High Andes – A manual to the birds of the temperate zone of the Andes and Patagonia, South America*. Copenhagen: Apollo. 880 p.
Fjeldså, J., Lambin, E., and Mertens, B. (1999) Correlation between endemism and local ecoclimatic stability documented by comparing Andean bird distributions and remotely sensed land surface data. *Ecography,* 22, 63–87.

Fjeldså, J., and Rahbek, C. (2006) Diversification of tanagers, a species rich bird group, from lowlands to montane regions of South America. *Integrative and Comparative Biology 46*, 72–81.
Flanagan, J. N., Franke, I., and Salinas, L. (2005). Aves y endemismo en los bosques relictos de la vertiente occidental andina del norte del Perú y sur del Ecuador. *Revista peruana de biología*, *12*(2), 239-248.
Fleming, T. (2003). Habermas on Civil Society, Lifeworld and System: Unearthing the Social Transformation Theory 2002 [cited November 18 2003].
Flores, E.R. (2016). Cambio climático: pastizales altoandinos y seguridad alimentaria. *Revista de Glaciares y Ecosistemas de Montaña, 1*, 73–80.
Food and Agriculture Organization of the United Nations (FAO). 2015. *Amazon Basin*. Accesed 25/10/2020. Available at: http://www.fao.org/nr/water/aquastat/basins/amazon/print1.stm
Food and Agriculture Organization of the United Nations (FAO) 2018. *FAOSTAT*. Retrieved from: http://www.fao.org/faostat/en/#home
Food and Agriculture Organization of the United Nations (FAO). 2019. *FAOSTAT Crops Data*. Retrieved from: http://www.fao.org/faostat/en/#data/QC.
Food and Agriculture Organization of the United Nations (FAO). 2018. *Overview of rural poverty in Latin America and the Caribbean. 21st century solutions to end poverty in the countryside*. Santiago, Chile. 112 p.
Food and Agriculture Organization of the United Nations (FAO). 2017. *The role of women in fisheries and aquaculture in Latin American countries.* Policy note. Santiago, Chile.
Food and Agriculture Organization of the United Nations (FAO). 2014. *The State of Food and Agriculture.* Rome, Italy.
Forero–Medina, G., Terborgh, J., Socolar, S.J., and Pimm, S.L. (2011). Elevational ranges of birds on a tropical montane gradient lag behind warming temperatures. *PLoS One, 6*(12), e28535.
Foster, P. (2001). The potential negative impacts of global change on tropical montane cloud forests. *Earth–Science Reviews, 55*, 73–106.
Francou, B. (2013). El rápido retroceso de los glaciares en los Andes Tropicales: Un desafío para el estudio de la dinámica de los ecosistemas de alta montaña. *Ecología en Bolivia*, *48*(2), 69–71.

Friedlingstein, P., Jones, M.W., O’Sullivan, M., Andrew, R.M., Hauck, J., Peters, G.P., Peters, W., Pongratz, J., Sitch, S., Le Quéré, C., Bakker, D.C.E., Canadell, J.G., …, and Zaehle, S. (2019). Global carbon budget 2019. *Earth System Science Data*, 11, 1783–1838.
Fundación para la Conservación y el Desarrollo Sostenible (2020). Diagnóstico del nivel de riesgo de los líderes y las organizaciones ambientales y de las medidas emprendidas en cada país (Bolivia, Ecuador, Perú y Colombia) hacia su prevención y protección. Informe de trabajo. Fondo de Patrimonio Natural, CEPF.
Fuselli, S., Tarazona–Santos, E., Dupanloup, I., Soto, I., Luiselli, D., and Pettener, D. (2003) Mitochondrial DNA diversity in South America and the genetic history of Andean highlanders. *Molecular Biology and Evolution, 20*, 1682–1691.
Galán, A., Méndez, E., Linares, E., Campos, J., and Vicente, J.A. (2014). Las comunidades vegetales relacionadas con los procesos criogénicos en los Andes peruanos. *Phytocoenologia, 44*(1–2), 121–161.
Gammons, C. H., Slotton, D. G., Gerbrandt, B., Weight, W., Young, C. A., McNearny, R. L., Cámac, E., Calderón, R., and Tapia, H. (2006). Mercury concentrations of fish, river water, and sediment in the Río Ramis-Lake Titicaca watershed, Peru. *Science of the Total Environment*, *368*(2-3), 637-648.

García, R., and Chacón de Ulloa, P. (2005). Estafilínidos (Coleoptera: Staphylinidae) en fragmentos de bosque seco del valle geográfico del río Cauca. *Colombian Journal of Entomology, 31*(1), 43–50.
Garzione, C.N., Hoke, G.D., Libarkin, J.C., Withers, S., MacFadden, B., Eiler, J., Ghosh, P, and Mulch, A. (2008). Rise of the Andes. *Science*, *320*(5881), 1304–1307.
Gauna, L.B. (2017). Cooperación internacional para el cambio climático. Estudio de casos: América Latina y la Unión Europea. *M+A Revista Electrónica de Medioambiente, 18*(1), 27–48.
Gentry, A.H. (1995) Patterns of diversity and floristic composition in Neotropical montane forests. En: S.P. Churchill, Balslev, H., Forero, E. y Luteyn, J.L. (Eds.). *Biodiversity and conservation of Neotropical montane forests*. (pp. 103–126) New York: New York Botanical Garden.
Gestion, R. 2019, March 1. *Agroexportaciones Sumaron US$ 7,030 Millones en 2018, ¿Qué Productos Tuvieron Más Ventas?* Available at: https://gestion.pe/economia/agroexportaciones-sumaron-us-7-030-millones-2018productos-tuvieron-ventas-254606.
Global Financial Integrity (2017). Transnational Crime and the Developing World. GFI
Goldstein, A., Turner, W.R., Spawn, S.A., Anderson–Teixeira, K.J., Cook–Patton, S., Fargione, J., …, and Hole, D.G. (2020). Protecting irrecoverable carbon in Earth's ecosystems. *Nature Climate Change, 10*(4), 287–295.
Gómez, T. (2020). Bats: Resistant to viruses, but not to humans. Retrieved from https://news.mongabay.com/2020/05/bats-resistant-to-viruses-but-not-to-humans/
Gonda, C. (2020). *Cambio climático y biodiversidad en los Andes Tropicales*. Buenos Aires: Fundación Ambiente y Recursos Naturales (FARN). 34 p.
Gonda, C. (2019). *El cambio climático y la criósfera andina*. Buenos Aires: Fundación Ambiente y Recursos Naturales (FARN). 59 p.
Gonzales, L. et al. Homicidio de defensores y defensoras de paz: una tragedia que no se detiene. IDEPAZ, 2018. Bogotá, Colombia.
Gorenflo, L.J. Warner D.B. (2016). Integrating biodiversity conservation and water development: in search of long-term solutions. *WIREs Water* 3: 301–311.
Grisales–Martínez, F., Velasco, J.A., Bolivar–García, W and Daza, J.M. 2017. The taxonomic and phylogenetic status of some poorly known *Anolis* species from the Andes of Colombia with the description of a *nomen nudum* taxa. Zootaxa 4303, 213–230.
Gutiérrez, R.C., Chaparro, J.C., Vásquez, M.Y., Quiroz, A.J., Aguilar–Kirigin, A., and Abdala, C.S. (2018). Descripción y relaciones filogenéticas de una nueva especie de *Liolaemus* (Iguania: Liolaemidae) y notas sobre el grupo de *L. montanus* de Perú. *Cuadernos de Herpetología*, *32*., 81–99.
Guzmán–Mendoza, R., Calzontzi–Marín, J., Salas–Araiza, M.D., and Martínez–Yáñez, R. (2016). La riqueza biológica de los insectos: análisis de su importancia multidimensional. *Acta zoológica mexicana*, *32*(3), 370–379.
Haffer, J. and Prance, G. (2001). Climatic forcing of evolution in Amazonia during the Cenozoic: on the refuge theory of biotic differentiation. *Amazoniana, 16*(3–4), 579–607.
Hansen, M. C., Potapov, P. V., Moore, R. Hancher, M., Turubanova, S. A., Tyukavina, A., Thau, D., Stehman, S. V.,Goetz, S. J., Loveland, T. R., Kommareddy, A., Egorov, A., Chini, L., Justice, C. O. and Townshend, J. R. G. 2013. High-resolution global maps of 21st-Century. Science, 342. doi:10.1126/science.1244693
Hardy, D.R., and Hardy, S.P. (2008). White–winged Diuca Finch (*Diuca speculifera*) nesting on Quelccaya Ice Cap, Perú. *The Wilson Journal of Ornithology*, *120*(3), 613–617.
Hartley, A.J. (2003). Andean uplift and climate change. *Journal of the Geological Society,* 160, 7–10.

Heinz, M., Schmidt, V., and Schaefer, M. (2005). New distributional record for the Jocotoco Antpitta *Grallaria ridgelyi* in south Ecuador. *Cotinga*, 23, 24-26.
Helgen, K.M., Pinto, C.M., Kays, R., Helgen, L.E., Tsuchiya, M.T.N., Quinn, A., Wilson, D.E., and Maldonado, J.E. 2013. Taxonomic revision of the olingos (*Bassaricyon*), with description of a new species, the Olinguito. *ZooKeys,* 324, 1–83.
Herrera–Alva, V., Díaz, V., Castillo, E., Rodolfo, C., and Catenazzi, A. (2020). A new species of *Atelopus* (Anura: Bufonidae) from southern Peru. *Zootaxa, 4853*, 404–420.
Herrera–R., G.A., Oberdorff, T., Anderson, E.P., Brosse, S., Carvajal–Vallejos, F.M., Frederico, R.G., Hidalgo, M., Jezequel, C., Maldonado, M., Maldonado–Ocampo, J.A., … and Tedesco, P.A. (2020). The combined effects of climate change and river fragmentation on the distribution of Andean Amazon fishes. *Global Change Biology*, *26*(10), 5509–5523.
Herzog, S.K., Jørgensen, P.M., Martínez, R., Martius, C., Anderson, E.P., Hole, D.G., Larsen, T.H., Marengo, J.A., Ruiz, D. and Tiessen, H. (2010). *Efectos del cambio climático en la biodiversidad de los Andes Tropicales: el estado del conocimiento científico.* São José dos Campos, Brasil: IAI. 32 p.
Herzog, S.K., and Kattan, G.H. (2012). Patrones de diversidad y endemismo en las aves de los Andes tropicales. En: S.K. Herzog, R. Martínez, P. Jorgensen, y H. Tiessen (Eds.). *Cambio climático y biodiversidad en los Andes Tropicales*. (pp. 287–305). Paris: IAI y SCOPE.
Hoffmann, C., García Márquez, J.R., Krueger, T. (2018). A local perspective on drivers and measures to slow deforestation in the Andean-Amazonian foothills of Colombia. Land use policy 77, 379–391. Downdloaded from https://doi.org/10.1016/j.landusepol.2018.04.043
Hoffmann, D., and Requena, C. (2012). *Bolivia en un mundo 4 grados más caliente. Escenarios sociopolíticos ante el cambio climático para los años 2030 y 2060 en el Altiplano norte*. La Paz: Bolivian Mountain Institute (BMI). 168 p.
Huasasquiche J. and Kometter R. (2018). *Aporte de los saberes comunales andinos en la utilización de los bienes y servicios ecosistémicos. Estudio de la Mancomunidad Saywite Choquequirao Ampay, Región Apurímac–Perú*. Lima: Andean Forest Program, Helvetas. 25 p.
Huber, O., and Riina, R. (Eds.) (1997). *Glosario fitoecológico de las Américas. Volumen I, América del Sur: países hispanoparlantes*. Caracas: UNESCO and Fundación Instituto Botánico de Venezuela. 500 p.
Huamaní, L., Quiroz, A.J., Gutiérrez, R.C., Aguilar, A., Huanca, W., Valladares, P., Cerdeña, J., Chaparro, J.C., Santa Cruz, R., and Abdala, C.S. (2020). Some color in the desert: description of a new species of *Liolaemus* (Iguania: Liolaemidae) from southern Peru, and its conservation status. *Amphibian & Reptile Conservation, 14*(3), 1–30.
Hofstede, R., Calles, J., López, V., Polanco, R., Torres, F., Ulloa, J., Vásquez, A., and Cerra, M. (2014). *Los páramos andinos ¿Qué sabemos? Estado de conocimiento sobre el impacto del cambio climático en el ecosistema páramo*. Quito: UICN.
Hofstede, R., Segarra, P., and Mena, P. (2003). *Los páramos del mundo. Proyecto Atlas Mundial de los Páramos*. Quito: Global Peatland Initiative / NC-IUCN / EcoCiencia.
Ibañez, A.N., La Torre, M. Á., and Mallma, G.A. (2018). Using foresight to gain a local perspective on the future of ecosystem services in a mountain protected area in Peru. *Mountain Research and Development*, *38*(3), 192–202.
IDB (Inter-American Development Bank) (2020). *Policies to combat the pandemic. Macroeconomic Report for Latin America and the Caribbean*. Inter-American Development Bank.
IDB (Inter-American Development Bank) (2019a). *The impact of COVID-19 on the economies of the region*. Inter-American Development Bank. Andean Group countries department.

IDB (Inter-American Development Bank) (2019b). *Rough Patch: Latin America and the Caribbean amid the global trade slowdown.* "Trade and Integration Monitor 2019." Inter-American Development Bank.

IDEAM, PNUD, MADS, DNP, and Cancillería. (2016). *Inventario nacional y departamental de Gases Efecto Invernadero – Colombia*. Tercera Comunicación Nacional de Cambio Climático. Bogotá: IDEAM, PNUD, MADS, DNP, Cancillería, FMAM.

International Monetary Fund, United States of America (IMF). 2019. *World Economic Outlook Update: Still Sluggish Global Growth*. Washington, D. C., United States of America. 9 p. Accessed 10/11/2020. Available at https://www.imf.org/en/Publications/WEO/Issues/2019/07/18/WEOupdateJuly2019.

Investors in Leaders, Living in a VUCA World. 2018. Disponible en: https://www.truedgeconsulting.com/innovation/vuca/

IPCC (Intergovernmental Panel on Climate Change) (2013). *Working Group I contribution to the IPCC Fifth Assessment Report. Climate change 2013: the physical science basis summary for policymakers.* Cambridge, UK: IPCC.

Ipenza, C. (2020) Diagnóstico que evalúa la presencia de actividad minera aurífera y sus impactos a nivel de tres corredores, así́ como áreas naturales protegidas vinculadas, en el hotspot Andes Tropicales del Perú. Frankfurt Zoological Society. Lima.

Isler, M.L., Chesser, R.T., Robbins, M.B., Cuervo, A.M., Cadena, C.D., and Hosner, P.A. (2020). Taxonomic evaluation of the *Grallaria rufula* (Rufous Antpitta) complex (Aves: Passeriformes: Grallariidae) distinguishes sixteen species. *Zootaxa*, *4817*(1), 1–74.

Iturralde–Pólit, P., Dangles, O., Burneo, S.F., and Meynard, C.N. (2017). The effects of climate change on a mega–diverse country: predicted shifts in mammalian species richness and turnover in continental Ecuador. *Biotropica*, *49*(6), 821.

IUCN (International Union for Conservation of Nature) (2016). *A Global Standard for the Identification of Key Biodiversity Areas*. Version 1.0. First edition. Gland, Switzerland: IUCN.

IUCN (International Union for Conservation of Nature (2020). *The IUCN Red List of Threatened Species*. Version 2020-2. Retrieved from: https://www.iucnredlist.org

IUCN SSC (IUCN Species Survival Commission) Amphibian Specialist Group. (2020). *Telmatobius culeus*. *The IUCN Red List of Threatened Species* 2020: e.T57334A3058114. Retrieved from: https://dx.doi.org/10.2305/IUCN.UK.2020-2.RLTS.T57334A3058114.en

IWGIA (2019). *The indigenous world 2019*. International Work Group for Indigenous Affairs. Copenhagen.

Jiménez, P., Aguirre, W., Laaz, E., Navarrete, R., Nugra, N., Revolledo, E., Torres, A., and Valdiviezo, J. (2015). *Guía de peces para aguas continentales en la vertiente occidental del Ecuador*. Esmeraldas: Ecuador. Pontificia Universidad Católica del Ecuador, Sede Esmeraldas. 416 p.

Jiménez, C.F., and Pacheco, V. (2016). A new species of grass mouse, genus *Akodon* Meyen, 1833 (Rodentia, Sigmodontinae), from the central Peruvian Yungas. *Therya*, *7*(3), 449–464.

Jiménez, I., Distler, T., and Jørgensen, P. M. (2009). Estimated plant richness pattern across northwest South America provides similar support for the species-energy and spatial heterogeneity hypotheses. *Ecography*, *32*(3), 433-448.

Jorgensen, P., Herzog, S., Martínez, S., and Tiessen, H. (2012). Patrones regionales de diversidad y endemismo en las plantas vasculares. En: S.K. Herzog, R. Martínez, P. Jorgensen, and H. Tiessen (Eds.). *Cambio climático y biodiversidad en los Andes Tropicales*. (pp. 221–234). Paris: IAI and SCOPE.

Jørgensen, P. M., Ulloa Ulloa, C., León, B., León-Yánez, S., Beck, S. G., Nee, M., ... and Gradstein, R. (2011). Regional patterns of vascular plant diversity and endemism. *Climate Change and Biodiversity in the Tropical Andes. Inter-American Institute for Global Change Research (IAI) and Scientific Committee on Problems of the Environment (SCOPE)*, 192-203.

Josse, C., Cuesta, F., Navarro, G., Barrena, V., Becerra, M.T., Cabrera, E., Chacón–Moreno, E, Ferreira, W., Peralvo, M., Saito, J., and Tovar, A. (2012). Geografía física y ecosistemas de los Andes Tropicales. En: S.K. Herzog, R. Martínez, P. Jorgensen, and H. Tiessen (Eds.). *Cambio climático y biodiversidad en los Andes Tropicales*. (pp. 177–194). Paris: IAI and SCOPE.

Josse, C., Cuesta. F., Navarro, G., Barrena, V., Cabrera, E., Chacón–Moreno. E., Ferreira, W., Peralvo, M., Saito, J., and Tovar, A. (2009). *Ecosistemas de los Andes del Norte y Centro*. Bolivia, Colombia, Ecuador, Perú y Venezuela. Lima: Secretaría General de la Comunidad Andina, Programa Regional ECOBONA–Intercooperation, CONDESAN–Proyecto Páramo Andino, Programa BioAndes, EcoCiencia, NatureServe, IAvH, LTA–UNALM, ICAE–ULA, CDC–UNALM, RumBOL SRL.

Josse, C., C. Morales and X. Cornejo (2013) Bosque siempreverde estacional de tierras bajas del Chocó ecuatorial. Pp. 39–41, en: Sistema de clasificación de los ecosistemas del Ecuador continental. Proyecto Mapa de Vegetation Ecuador, Ministry of Environment of Ecuador. Quito.

Joppa, L.N., Roberts, D.L., Myers, N., and Pimm, S.L. (2011). Biodiversity hotspots house most undiscovered plant species. *Proceedings of the National Academy of Sciences*, *108*(32), 13171–13176.

Kahn, T.R., La Marca, E., Lötters, S., Brown, J.L., Twomey, E., and Amézquita, A. (2016). Aposematic poison frogs (Dendrobatidae) of the Andean countries: Bolivia, Colombia, Ecuador, Peru and Venezuela. Conservation International Tropical Field Guide Series. Arlington: Conservation International. 588 p.

Kattan, G. H., Franco, P., Rojas, V., and Morales, G. (2004). Biological diversification in a complex region: a spatial analysis of faunistic diversity and biogeography of the Andes of Colombia. *Journal of Biogeography*, *31*(11), 1829-1839.

KBA Standards and Appeals Committee. (2020). Guidelines for using a Global Standard for the Identification of Key Biodiversity Areas. Version 1.1. Prepared by the KBA Standards and Appeals Committee of the IUCN Species Survival Commission and IUCN World Commission on Protected Areas. Gland, Switzerland: IUCN.

Kendall A. and Chepstow-Lusty, A. (2006). *Cultural and environmental change in the Cuzco region of Peru: rural development implication of combined archaeological and palaeoecological evidence.* Pp 185-197 P. Dransart, ed. Kay Pacha: cultivating earth and water in the Andes. Oxford, UK: BAR International Series 1478.

Key Biodiversity Areas Partnership (2020) *Key Biodiversity Areas factsheet: La Victoria (Nariño).* Extracted from the World Database of Key Biodiversity Areas. Developed by the Key Biodiversity Areas Partnership: BirdLife International, IUCN, American Bird Conservancy, Amphibian Survival Alliance, Conservation International, Critical Ecosystem Partnership Fund, Global Environment Facility, Global Wildlife Conservation, NatureServe, Rainforest Trust, Royal Society for the Protection of Birds, World Wildlife Fund and Wildlife Conservation Society. Recuperado de www.keybiodiversityareas.org.

Killeen, T.J., Douglas, M., Consiglio, T., Jørgensen, P.M., and Mejía, J. (2007). Dry spots and wet spots in the Andean hotspot. *Journal of Biogeography, 34*, 1357–1373.

Koch, C., and Venegas, P.J. (2016). A large and unusually colored new snake species of the genus *Tantilla* (Squamata; Colubridae) from the Peruvian Andes. *PeerJ*, *4*, e2767.

Koch, C., Venegas, P.J., and Böhme, W. (2015). Three new endemic species of *Epictia* Gray, 1845 (Serpentes: Leptotyphlopidae). *Zootaxa*, *3964*(2), 228–244.

Koehler, G., and Lehr, E. (2015). Two new species of lizards of the genus *Stenocercus* (Iguania, Tropiduridae) from central Peru. *Zootaxa*, *3956*(3), 413–427.

Köhler, G., and Lehr, E. (2004). Comments on *Euspondylus* and *Proctoporus* (Squamata: Gymnophthalmidae) from Peru, with the description of three new species and a key to the Peruvian species. *Herpetologica*, *60*(4), 501-518.

Krabbe, N.K. (2017). A new species of *Megascops* (Strigidae) from the Sierra Nevada de Santa Marta, Colombia, with notes on voices of New World screech-owls. *Ornitología Colombiana*, *16*, 1–27.

Krabbe, N.K., Schulenberg, T.S., Hosner, P.A., Rosenberg, K.V., Davis, T.J., Rosenberg, G.H., Lane, D.F., Andersen, M.J., Robbins, M.B., Cadena, C.D., Valqui, T., Salter, J.F., Spencer, A.J., Angulo, F., and Fjeldså, J. (2020). Untangling cryptic diversity in the High Andes: Revision of the *Scytalopus* [*magellanicus*] complex (Rhinocryptidae) in Peru reveals three new species. *The Auk, 137*(2), 1–26.

Kuhar, F., Pfister, D., and Truong, C. (2020). *Stilbohypoxylon macrosporum*. *The IUCN Red List of Threatened Species* 2020: e.T172740470A172861187. https://dx.doi.org/10.2305/IUCN.UK.2020-2.RLTS.T172740470A172861187.en.

La Marca, E., Lips, K. R., Lötters, S., Puschendorf, R., Ibáñez, R., Rueda-Almonacid, J. V., ... and García-Pérez, J. E. (2005). Catastrophic population declines and extinctions in Neotropical harlequin frogs (Bufonidae: *Atelopus*) 1. *Biotropica: The Journal of Biology and Conservation*, *37*(2), 190-201.

Landauro, C.Z., García–Bravo, A., and Venegas, P.J. (2015). An endemic new species of *Ameiva* (Squamata: Teiidae) from an isolated dry forest in southern Peru. *Zootaxa, 3946*(3), 387–400.

Lane, D.F., Kratter, A.W., and O'Neill, J.P. (2017). A new species of manakin (Aves: Pipridae; *Machaeropterus*) from Peru with a taxonomic reassessment of the Striped Manakin (*M. regulus*) complex. *Zootaxa*, *4320*(2), 379–390.

Latinobarómetro (2018). *2018 Report*. Corporación Latinobarómetro. Santiago de Chile.

Lehr, E., and Moravec, J. (2017). A new species of *Pristimantis* (Amphibia, Anura, Craugastoridae) from a montane forest of the Pui Pui Protected Forest in central Peru (Región Junín). *ZooKeys, 645*, 85–102.

Lehr, E., Moravec, J., Lundberg, M., Köhler, G., Catenazzi, A., and Šmíd, J. (2019). A new genus and species of arboreal lizard (Gymnophthalmidae: Cercosaurinae) from the eastern Andes of Peru. *Salamandra*, *55*(1), 1–13.

Lehr, E., and Rodríguez, D. (2017). Two new species of Andes Frogs (Craugastoridae: *Phrynopus*) from the Cordillera de Carpish in central Peru. *Salamandra, 53*(3), 327–338.

Lehr, E., and von May, R. (2017). A new species of terrestrial-breeding frog (Amphibia, Craugastoridae, *Pristimantis*) from high elevations of the Pui Pui Protected Forest in central Peru. *ZooKeys*, (660), 17–42.

Lehr, E., von May, R., Moravec, J., and Cusi, J.C. (2017a). A new species of *Phrynopus* (Amphibia, Anura, Craugastoridae) from upper montane forests and high Andean grasslands of the Pui Pui Protected Forest in central Peru. *ZooKeys, 713*, 131–157.

Lehr, E., von May, R., Moravec, J., and Cusi, J.C. (2017b). Three new species of *Pristimantis* (Amphibia, Anura, Craugastoridae) from upper montane forests and high Andean grasslands of the Pui Pui Protected Forest in central Peru. *Zootaxa*, *4299*(3), 301–336.

Lenzen M, Li M, Malik A, Pomponi F, Sun YY, T. Wiedmann. (2020) Pérdidas socioeconómicas globales y ganancias ambientales de la pandemia de Coronavirus. PLoS ONE 15 (7): e0235654.

https://doi.org/10.1371/journal.pone.0235654
Lizcano, D. J., Amanzo, J., Castellanos, A., Tapia, A., and Lopez-Malaga, C. M. (2016). *Tapirus pinchaque*. The IUCN red list of threatened species 2016: e. T21473A45173922.
Llambí, L. D., Becerra, M. T., Peralvo, M., Avella, A., Barufol, M., Díaz, L.D. (2019). Construcción de una Estrategia para el Monitoreo Integrado de los Ecosistemas de Alta Montaña en Colombia. Biodiversidad en la Práctica 4:
Llambí, L. D., M. T. Becerra, M. Peralvo, A. Avella, M. Baruffol, and L. J. Flores (2020). Monitoring Biodiversity and Ecosystem Services in Colombia's High Andean Ecosystems: Toward an Integrated Strategy. Mountain Research and Development 39 (3): A8-A20.
López- Feldman, C. Chávez, M.A. Vélez, H. Bejarano, A. Chimeli, J. Féres, J. Robalino, R. Salcedo and C. Viteri (2020). COVID- 19: Impactos en el medio ambiente y en el cumplimiento de los ODS en América Latina. Revista Desarrollo y Sociedad 104. Pp.: 104-132 86 Tercer Cuatrimestre.
Loza, A., and Mendoza, W. (2017). Evaluación poblacional y estado de conservación de *Telmatobius macrostomus* Peters, 1873 (Anura: Telmatobiidae) en humedales altoandinos, Región Pasco–Perú. *Revista de Investigaciones Altoandinas*, *19*(2), 145–156.
Lutz, D.A., Powell, R.L., and Silman, M.R. (2013). Four decades of Andean timberline migration and implications for biodiversity loss with climate change. *PLoS One, 8*(9), e74496.
Málaga J, Avila-Santamaría J., and Carpio C. (2019). *The Andean Region: An Important and Growing U.S. Agricultural Trade Partner*. 1 CHOICES 3rd Quarter 2019, 34(3).
Magalhães, N., Evangelista, H., Condom, T. (2019). Amazonian Biomass Burning Enhances Tropical Andean Glaciers Melting. *Sci Rep* 9, 16914. https://doi.org/10.1038/s41598-019-53284-
Maldonado, M., Maldonado–Ocampo, J.A., Ortega, H., Encalada, A.C., Carvajal–Vallejos, F.M., Rivadeneira, J.F., Acosta, F., Jacobsen, D., Crespo, A. and Rivera–Rondón, C.A. (2012). Diversidad en los sistemas acuaticos. En: S.K. Herzog, R. Martínez, P. Jorgensen, and H. Tiessen (Eds.). *Cambio climático y biodiversidad en los Andes Tropicales*. (pp. 325–347). Paris: IAI and SCOPE.
Mamani, L., Catenazzi, A., Ttito, A., Mallqui, S., and Chaparro, J.C. (2017). A new species of *Bryophryne* (Anura: Strabomantidae) from the Cordillera de Vilcabamba, southeastern Peruvian Andes. *Phyllomedusa 16*(2), 129–141.
Mamani, L., Chaparro, J.C., Correa, C., Alarcón, C., Salas, C.Y., and Catenazzi, A. (2020). A new species of andean Gymnophthalmid lizard (Squamata: Gymnophthalmidae) from the peruvian Andes, and resolution of some taxonomic problems. *Diversity, 12*, 361.
Mamani, L., Goicoechea, N., and Chaparro, J.C. (2015). A new species of Andean lizard *Proctoporus* (Squamata: Gymnophthalmidae) from montane forest of the Historic Sanctuary of Machu Picchu, Peru. *Amphibian and Reptile Conservation*, *9*(1), 1–11.
Marangunic, C. (2016). Glaciares y los ecosistemas de montaña: Las importantes tareas pendientes. *Revista de Glaciares y Ecosistemas de Montaña 1*(1), 11–19.
Marcillo–Lara, A., Coloma, L.A., Álvarez–Solas, S., and Terneus, E. (2020). The gastromyzophorous tadpoles of *Atelopus elegans* and *A. palmatus* (Anura: Bufonidae), with comments on oral and suction structures. *Neotropical Biodiversity*, *6*(1), 1–13.
Marengo, J.A., Pabón, J.D., Díaz, A., Rosas, G., Ávalos, G., Montealegre, E., Villacis, M., Solman, S., and Rojas, M. (2012). Diversidad en los sistemas acuáticos. En: S.K. Herzog, R. Martínez, P. Jorgensen, y H. Tiessen (Eds.). *Cambio climático y biodiversidad en los Andes Tropicales*. (p. 131–149). Paris: IAI and SCOPE.

Marín, E., & Millares, N. (2017). Las organizaciones de la sociedad civil latinoamericana y su oferta de valor. Estudio de caso: México, Brasil, Colombia y Argentina. OASIS, 25, pp. 187-221.

Marquet, P., A. Lara, A. Altamirano, A. Alaniz, C. Álvarez, M. Castillo, M. Galleguillos, A. Grez, A. Gutiérrez, J. Hoyos-Santillán, D. Manuschevich, R. M. Garay, A. Miranda, E. Ostria, F. Peña-Cortéz, J. Pérez-Quezada, A. Sepúlveda, J. Simonetti and C. Smith (2019). Cambio de uso del suelo en Chile: Oportunidades de mitigación ante la emergencia climática. Informe de la mesa Biodiversidad. Santiago: COP25 Scientific Committee; Ministry of Science, Technology, Knowledge and Innovation.

Márquez, Y., Monroy, K.J., Martínez, E.G., Peña, V.H., Monroy, A.L. (2019). Influencia de la temperatura ambiental en el mosquito *Aedes* spp. y la transmisión del virus del dengue. *Revista CES Medicina, 33*(1), 42–50.

Masera, O., H. Riojas- Rodriguez, R. Pérez- Padilla, M. Serrano- Medrano, A. Shilmann, V. Ruíz- García, L. A. de la Sierra and V. Berrueta (2020). Vulnerabilidad a COVID- 19 en poblaciones rurales y periurbanas por el uso doméstico de leña. https://www.insp.mx/resources/images/stories/repositorio-insp-covid19/pdfs/Vulnerabilidad_a_COVID_por_humo_de_lena.pdf

Mateus, S. (2019) La Deforestación en Colombia - Propuestas para la Mitigación de sus Efectos. Universidad Militar Nueva Granada.

McCain, C.M. (2010). Global analysis of reptile elevational diversity. *Global Ecology and Biogeography 19*, 541–553.

McClain, M.E., and Elsenbeer, H. (2001). Terrestrial inputs to Amazon streams and internal biogeochemical processing. En: M.E. McClain, R.L. Victoria, and J.E. Richey, J.E. (Eds.). *The biogeochemistry of the Amazon Basin* (pp. 185–208). New York: Oxford University Press.

McClain, M.E., and Naiman, R.J. (2008). Andean influences on the biogeochemistry and ecology of the Amazon River. *BioScience*, 58, 325–338.

McGeoch, M.A., and Chown, S.L. (1998). Scaling up the value of bioindicators. *Trends in Ecology & Evolution*, *13*(2), 46–47.

Meehl, G.A., Stocker, T.F., Collins, W.D., Friedlingstein, P., Gaye, A.T., Gregory, J.M., Kitoh, A., Knutti, R., Murphy, J.M., Noda, A., …, y Zhao, Z.C. (2007). Global climate projections. En: S. Solomon, D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor, and H.L. Miller (Eds.). Climate change 2007: the physical science basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. (p. 757–846). Cambridge: Cambridge University Press.

Mena, J.L., Solari, S., Carrera, J.P., Aguirre, L.F., and Gómez, H. (2012). Diversidad de pequeños mamíferos en los Andes Tropicales: Visión General. En: S.K. Herzog, R. Martínez, P. Jorgensen, y H. Tiessen (Eds.). *Cambio climático y biodiversidad en los Andes Tropicales*. (pp. 307–324). Paris: IAI and SCOPE.

Metzger, M., Bunce, R., Jongman, R., Sayre, R., Trabucco, A., and Zomer, R. (2013). *A high-resolution bioclimate map of the world: a unifying framework for global biodiversity research and monitoring. Global Ecology and Biogeography, 22*(5/6), 630–638.

Micale, V., Tonkonogy, B., and Mazza, F. (2018). *Understanding and increasing finance for climate adaptation in developing countries*. London: Climate Policy Initiative and Adelphi.

Milano, F. (Ed.) (2019). Gobiernos y sociedad civil avanzando agendas climáticas. *Monografía del BID 663*. Inter–American Development Bank.

Miles, L., Newton, A. C., DeFries, R. S., Ravilious, C., May, I., Blyth, S., ... and Gordon, J. E. (2006). A global overview of the conservation status of tropical dry forests. *Journal of biogeography*, *33*(3), 491-505.

Ministerio del Ambiente. (2015). Valoración Económica del Aporte del Sistema Nacional de Áreas Protegidas a la Nueva Matriz Energética del Ecuador: Sector Hidroeléctrico. Quito – Ecuador

Ministerio del Ambiente del Ecuador (2017). Tercera Comunicación Nacional del Ecuador sobre Cambio Climático. Quito, Ecuador.
Ministry of Environment of Colombia (2019). *Informe Anual sobre el comportamiento de visitantes a áreas protegidas nacionales, con vocación ecoturística.* Accessed 10/11/2020. Available at: https://www.parquesnacionales.gov.co/portal/wp-content/uploads/2013/11/informe-visitantes-2019-final.pdf
Mittermeier, R. A., Robles G. P., Hoffmann, M., Pilgrim, J., Brooks, T., Mittermeier, C.
G., *et al*. (2004) *Hotspots Revisited*. Mexico City, Mexico: CEMEX.
Mittermeier, R.A., Turner, W.R., Larsen, F.W., Brooks, T.M., and Gascon, C. (2011) Global biodiversity conservation: the critical role of hotspots. En: F.E. Zachos, and J.C. Habel (Eds.). *Biodiversity hotspots: Distribution and protection of conservation priority areas* (pp. 3–22). Heidelberg: Springer–Verlag Berlin.
Mitofsky (2020). Aprobación de mandatarios América y el mundo. Retrieved from: http://consulta.mx/index.php/encuestas-e-investigaciones/el-mundo
Miyamoto, K., Sato, T., Arana, E.A., Orellana, G.C., and Rohner, C.M. (2018). Variation in tree community composition and carbon stock under natural and human disturbances in Andean forests, Peru. *Forests, 9*(7), 390.
Mojica, J.I., C. Castellanos, S. Usma, and R. Álvarez. (2002) *Libro rojo de peces dulceacuícolas de Colombia*. Bogota: Instituto de Ciencias Naturales, Universidad de Colombia, Ministerio del Medio Ambiente.
Molina, C., Señaris, J.C., Lampo, M., and Rial, A. (2009) *Anfibios de Venezuela: Estado de Conocimiento y recomendaciones para su conservación*. Caracas, Venezuela: Ediciones Grupo TEI.
Molinari, J., Bustos, X.E., Burneo, S.F., Camacho, M.A., Moreno, S.A., and Fermin, G. (2017). A new polytypic species of yellow-shouldered bats, genus *Sturnira* (Mammalia: Chiroptera: Phyllostomidae), from the Andean and coastal mountain systems of Venezuela and Colombia. *Zootaxa*, *4243*(1), 75–96.
Moncrieff, A.E., Johnson, O., Lane, D.F., Beck, J.R., Angulo, F., and Fagan, J. (2018). A new species of antbird (Passeriformes: Thamnophilidae) from the Cordillera Azul, San Martín, Peru. *The Auk 135*(1), 114–126.
Mongabay (2020). La carrera por salvar especies amenazadas en tiempos de Covid-19. Descargado de https://es.mongabay.com/2020/05/la-carrera-por-salvar-especies-amenazadas-en-tiempos-de-covid-19/
Mongabay (2020). Tráfico de fauna en Perú. Imágenes impactantes del comercio ilegal de especies. Descargado de https://es.mongabay.com/2018/11/trafico-fauna-peru-fotos-videos/
Montoya, H., Fiestas, J.A., Cruz, R., Quispe, R., and Rodríguez, S. (2019). Comunidades criofílicas de los glaciares del nevado de Allincapac, Andes del sur de Perú, departamento de Puno: variabilidad fenotípica de la cianobacteria *Nostoc commune* (Nostocales, Nostocaceae). *Arnaldoa*, *26*(2), 657–674.
Moraes, M., Øllgaard, B., Kvist, L.P., Borchsenius, F. and Balslev, H. (Eds.). *Botánica económica de los Andes Centrales.* La Paz: Universidad Mayor de San Andrés. 557 p.
Moravec, J., Šmíd, J., Štundl, J., and Lehr, E. (2018). Systematics of Neotropical microteiid lizards (Gymnophthalmidae, Cercosaurinae), with the description of a new genus and species from the Andean montane forests. *ZooKeys*, 774, 105–139.
Moreno, J. and Ruiz, E. (2016). El vínculo entre biodiversidad-cambio climático: un elefante en la habitación. ¿Cómo podemos actuar las empresas y organizaciones? Madrid. Downloaded from: https://foretica.org/vinculo_biodiversidad_y_cambio_climatico.pdf
Moret, P., Arauz, M.A., Gobbi, M., and Barragán, A. (2016). Climate warming effects in the Tropical Andes: First evidence for upslope shifts of Carabidae (Coleoptera) in Ecuador. *Insect Conservation and Diversity, 9*(4), 342–350.

Morueta–Holme, N., Engemann, K., Sandoval–Acuna, P., Jonas, J.D., Segnitz, R.M. and Svenning, J.C. (2015). Strong upslope shifts in Chimborazo's vegetation over two centuries since Humboldt. *Proceedings of the National Academy of Sciences, 112*(41), 12741–12745.

Müller, R., Pacheco, P., and Montero, J.C. (2014). *El contexto de la deforestación y degradación de los bosques en Bolivia: Causas, actores e instituciones*. Documentos Ocasionales 100. Bogor, Indonesia: CIFOR.

Mulligan, M., Rubiano, J., Hyman, G., White, D., Garcia, J., Saravia, M., ... & Leonardo Saenz-Cruz, L. (2010). The Andes basins: biophysical and developmental diversity in a climate of change. *Water International*, *35*(5), 472-492.

Muñoz-Gómez, F. A., Galicia- Sarmiento and Humberto-Pérez, E. (2018). Agricultura migratoria conductor del cambio de uso de suelo de ecosistemas Alto Andinos de Colombia. *Biotecnología en el Sector Agropecuario y Agroindustrial* 16(1): 15-25.

Muñoz Rojas, C. (2019). *Educación técnico-profesional y autonomía económica de las mujeres jóvenes en América Latina y el Caribe*. Serie Asuntos de Género, N° 155 (LC/TS.2019/26). Economic Commission for Latin America and the Caribbean (ECLAC). Santiago de Chile.

Mutke, J., Jacobs, R., Meyers, K., Henning, T., and Weigend, M. (2014). Diversity patterns of selected Andean plant groups correspond to topography and habitat dynamics, not orogeny. *Frontiers in genetics*, *5*, 351, 1–15.

Myers, N., Mittermeier, R.A., Mittermeier, C.G., da Fonseca, G.A., and Kent, J. (2000). Biodiversity hotspots for conservation priorities. *Nature, 403*, 853–858.

National Parks Administration/Biodiversity Information System (2019). Data updated to 2019. sib.gob.ar

National Institute of Human Rights (INDH). 2015. *Mapa de conflictos socioambientales en Chile 2015*, Santiago.

National Geographic. (2019). *South America: Resources*. Accesed 10/11/2020. Available at: https://www.nationalgeographic.org/encyclopedia/south-america-resources/.

Navarro, G., and Maldonado, M. (2002). *Geografía ecológica de Bolivia: Vegetación y ambientes acuáticos*. Cochabamba, Bolivia: Centro de Ecología Simón I. Patiño. 719 p.

Neukom, R., Rohrer, M., Calanca, P., Salzmann, N., Huggel, C., Acuña, D., Christie, D.A., and Morales, M.S. (2015). Facing unprecedented drying of the Central Andes? Precipitation variability over the period AD 1000–2100. *Environmental Resources Letter, 10*, 084017.

Noguera–Urbano, E.A. and Escalante, T. (2015). Áreas de endemismo de los mamíferos (Mammalia) neotropicales. *Acta Biológica Colombiana*, 20(3), 47–65.

Noh, J.K., Echeverría, C., Kleemann, J., Koo, H., Fürst, C., and Cuenca, P. (2020). Warning about conservation status of forest ecosystems in Tropical Andes: National assessment based on IUCN criteria. *PLoS One*, *15*(8), e0237877.

Observatory of Economic Complexity (OEC). 2019. *Bananas*. Accessed 10/11/2020. Available at: https://oec.world/en/profile/hs92/0803/

Ocampo-Peñuela, N., Pimm, S.L., (2014). Setting Practical Conservation Priorities for Birds in the Western Andes of Colombia. Conserv. Biol. 28, 1260-1270. https://doi.org/10.1111/cobi.12312.

OECD (Organisation for Economic Co-operation and Development) (2020), *Estudios de la OCDE sobre políticas públicas de conducta empresarial responsable: Perú,* OCDE París.

OECD (Organisation for Economic Co-operation and Development) (2020). Government at a Glance: Latin America and the Caribbean 20*20*. OECD Publishing, Paris.

OECD (Organisation for Economic Co-operation and Development) (2020). Government at a Glance: Latin America and the Caribbean 2020. OECD Publishing, Paris, https://doi.org/10.1787/1256b68d-es.
OECD (Organisation for Economic Co-operation and Development) (2019), Government at a Glance 2019, OECD Publishing, Paris, https://dx.doi.org/10.1787/8ccf5c38-en
OECD (Organisation for Economic Co-operation and Development) et al. (2019). *Latin American Economic Outlook 2019: Development in transition*, OECD Publishing, Paris.
OECD (Organisation for Economic Co-operation and Development) (2020), *Panorama of Public Administrations Latin America and the Caribbean 2020, OECD Publishing, Paris,* https://doi.org/10.1787/1256b68d-es.
OECD (Organization for Economic Co-operation and Development, France); SEGIB (Ibero-American General Secretariat, Spain); BBVAMF (BBVA Microfinance Foundation, Spain). 2019. *Social Institutions and Gender Index 2019 (SIGI)*. Madrid, Spain. 1 p. Accessed 10/11/2020. Available at: https://www.genderindex.org/countries/

OIM (2018). Tendencias migratorias en las Américas. Disponible en: https://robuenosaires.iom.int/sites/default/files/Informes/Tendencias_Migratorias_Nacionales_en_Americas__V enezuela_ES_Julio_2018_web.pdf
OIM (2017b) Informe Migratorio Sudamericano N2 año 2017. Disponible en: https://robuenosaires.iom.int/sites/default/files/Documentos%20PDFs/Recientes_tendencias_migratorias_extra_e_intra_regionales_y_extra_continentales_en_america_del_sur_es.pdf
Ojala-Barbour, R., Pinto, C. M., Brito M, J., Albuja V, L., Lee Jr, T. E., and Patterson, B. D. (2013). A new species of shrew-opossum (Paucituberculata: Caenolestidae) with a phylogeny of extant caenolestids. *Journal of Mammalogy*, *94*(5), 967-982.
OLADE (Organización Latinoamericana de Energía) (2019). *Panorama Energético de América Latina y El Caribe 2019.* Quito-Ecuador.
OLADE. Organización Latinoamericana de Energía (2019). Panorama Energético de América Latina y el Caribe. http://biblioteca.olade.org/opac-tmpl/Documentos/old0433a.pdf
Olson, D. (2010) A decade of conservation by the Critical Ecosystem Partnership Fund 2001-2010: An independent evaluation of CEPF's global conservation impact. Arlington, VA:Conservation Earth for the CEPF.
OMS (Organización Mundial de la Salud) (2020). Informes de situación de la enfermedad por coronavirus (COVID-   2019). Ginebra, Suiza: Organización Mundial de la Salud.
ORAS–CONHU, Organismo Andino de Salud–Convenio Hipólito Unanue (2020). *Plan andino de salud y cambio climático 2020 – 2025*. Washington, DC: Organismo Andino de Salud–Convenio Hipólito Unanue and Organización Panamericana de la Salud.
Ordóñez-Delgado, L., Székely, P., Székely, D., Serrano, F., and Armijos-Ojeda, D. (2020). Plan de Acción para la Conservación de los Anfibios del Abra de Zamora. Universidad Técnica Particular de Loja y Naturaleza y Cultura Internacional. Loja, Ecuador. doi: 10.13140/RG.2.2.15950.08008
Orduz, N. (2015). Análisis de discursos de REDD+ como estrategia equitativa de conservación y uso de la biodiversidad. *Ambiente y Desarrollo, 19*(37), 115–130.
OREALC/UNESCO (Organización de las Naciones Unidas para la Educación, la Ciencia y la Cultura y la Oficina Regional de Educación para América Latina y el Caribe) (2019). Antecedentes para una estrategia regional de respuesta de la UNESCO a la situación de personas en contexto de movilidad en América Latina y el Caribe. Chile. Descargado de:

http://www.unesco.org/new/fileadmin/MULTIMEDIA/FIELD/Santiago/pdf/UNESDOC-Documento-de-trabajo-Antecedentes-para-una-estra.pdf
Ortega, H., and Hidalgo, M. (2008) Freshwater fishes and aquatic habitats in Peru: current knowledge and conservation. *Aquatic Ecosystem Health & Management*, 11, 257–271.
Ortega, H., Hidalgo, M., Correa, E., Espino, J., Chocano, L., Trevejo, G., Meza, V., Cortijo, A.M. and Quispe, R. (2011) *Lista anotada de los peces de aguas continentales del Perú: Estado actual del conocimiento, distribución, usos y aspectos de conservación.* Lima: Ministerio del Ambiente, and Museo de Historia Natural–UNMSM.
Ortega–Andrade, H.M., Rojas–Soto, O.R., Valencia, J.H., Espinosa de los Monteros, A., Morrone, J.J., Ron, S.R., and Cannatella, D.C. (2015). Insights from integrative systematics reveal cryptic diversity in *Pristimantis* frogs (Anura: Craugastoridae) from the Upper Amazon Basin. *PLoS one*, *10*(11), e0143392.
Pabón–Caicedo, J.D., Arias, P.A., Carril, A.F., Espinoza, J.C., Borrel, L.F., Goubanova, K., Lavado–Casimiro, W., Masiokas, M., Solman, S., and Villalba, R. (2020). Observed and projected hydroclimate changes in the Andes. *Frontiers in Earth Science, 8*, 61.
Pacha, M.J. (Ed.) (2020). *Infraestructura natural en la cuenca del río Lurín en Perú para prevenir desastres. Hacia el diseño de políticas públicas con visión territorial que incorporen inversión en infraestructura natural en cuencas medias y altas, para la prevención de desastres*. Lima: Climate and Development Knowledge Network (CDKN).
Pacheco, V., Sánchez–Vendizú, P., and Solari, S. (2018). A new species of *Anoura* Gray, 1838 (Chiroptera: Phyllostomidae) from Peru, with taxonomic and biogeographic comments on species of the *Anoura caudifer* complex. *Acta Chiropterológica*, *20*(1), 31–50.
Páez, N.B., and Ron, S.R. (2019) Systematics of *Huicundomantis*, a new subgenus of *Pristimantis* (Anura, Strabomantidae) with extraordinary cryptic diversity and eleven new species. *ZooKeys, 868*, 1–112.
Painter, L., T.M., Siles, A. Reinaga & R. Wallace. (2013). Escenarios de deforestación en el Gran Paisaje Madidi-Tambopata. Consejo Indígena del Pueblo Tacana y Wildlife Conservation Society. La Paz, Bolivia.
Parra, V., Nunes, P.M., and Torres–Carvajal, O. (2020) Systematics of *Pholidobolus* lizards (Squamata, Gymnophthalmidae) from southern Ecuador, with descriptions of four new species. *ZooKeys, 954*, 109–156.
Pastor C. (2019). *Atlas. Los Grupos Económicos Agroalimentarios ¿Quién decide lo que producimos, exportamos y consumimos?* Carlos Pastor (coord.) Ediciones La Tierra. Quito
Patterson, B.D., Solari, S., and Velazco, P.M. (2012). The role of the Andes in the diversification and biogeography of Neotropical mammals. En: B.D. Patterson and L.P. Costa (Eds.). *Bones, Clones, and Biomes: The history and geography of recent Neotropical mammals*. (pp. 351–378). Chicago: University of Chicago Press.
Paz Jorge, M. de J., Kelman, R., S. Navas, L. Okamura, E. Feliu (2019). Vulnerabilidad al cambio climático y medidas de adaptación de los sistemas hidroeléctricos en los países andinos. Inter-American Development Bank IDB.
Pazmiño-Otamendi, G. 2019. *Emmochliophis miops* En: Torres-Carvajal, O., Pazmiño-Otamendi, G. and Salazar-Valenzuela, D. 2019. Reptiles del Ecuador. Versión 2019.0. Museo de Zoología, Pontificia Universidad Católica del Ecuador. Retrieved from https://bioweb.bio/faunaweb/reptiliaweb/FichaEspecie/Emmochliophis%20miops
Pastor C. Pazmiño, (2019). Atlas. Los Grupos Económicos Agroalimentarios ¿Quién decide lo que producimos, exportamos y consumimos? Ediciones La Tierra. Quito

Paz y Miño, J.J. (2020) Dependencia e industrialización. Historia y Presente. Accessed 15/11/2020. Available at: http://www.historiaypresente.com/dependencia-e-industrializacion/

Peña, P. (2014). *El marco legal peruano para implementar REDD*. Lima: Sociedad Peruana de Derecho Ambiental, SPDA. 36 p.

Pereira, J., Labiak, P. H., Stützel, T., and Schulz, C. (2017). Origin and biogeography of the ancient genus *Isoëtes* with focus on the Neotropics. *Botanical Journal of the Linnean Society*, *185*(2), 253-271.

Pérez-Rincón, M. (2014). *Conflictos ambientales en Colombia: inventario, caracterización y análisis.* Documento de Trabajo, N° IV, Cali, Universidad del Valle (UNIVALLE)/Instituto Cinara/Environmental Justice Organisations, Liabilities and Trade (EJOLT).

Peyre, G., Balslev, H., Font, X., and Tello, J.S. (2019). Fine–scale plant richness mapping of the Andean páramo according to macroclimate. *Frontiers in Ecology and Evolution*, *7*, 377.

Pickersgill, B. (2007). Domestication of plants in the Americas: Insights from mendelian and molecular genetics. *Annals of Botany 100*, 925–940

Piana, R.P. (2019). Human–caused and Yawar Fiesta–derived mortality of Andean Condors (*Vultur gryphus*) in Peru. *The Wilson Journal of Ornithology*, *131*(4), 833–838.

PNUMA (Programa de Naciones Unidas para el Medio Ambiente) (2016a). *Perfil de país – Bolivia. Marco regulatorio y financiamiento para cambio climático*. Panamá: Regatta, UN Environment.

PNUMA (Programa de Naciones Unidas para el Medio Ambiente) (2016b). *Perfil de país – Venezuela. Marco regulatorio y financiamiento para cambio climático*. Panamá: Regatta, UN Environment.

Poe, S., Latella, I., Ayala–Varela, F., Yañez–Miranda, C., and Torres–Carvajal, O. (2015). A new species of Phenacosaur *Anolis* (Squamata; Iguanidae) from Peru and a comprehensive phylogeny of *Dactyloa*-clade *Anolis* based on new DNA sequences and morphology. *Copeia*, *103*(3), 639–650.

Pouilly, M., Lazzaro, X., Point, D., and Aguirre, M. (2014). *Línea base de conocimientos sobre los recursos hidrológicos en el sistema TDPS con enfoque en la cuenca del Lago Titicaca*. Quito: IRD – UICN. 320 p.

Pounds, J. A., Bustamante, M. R., Coloma, L. A., Consuegra, J. A., Fogden, M. P., Foster, P. N., ... and Ron, S. R. (2006). Widespread amphibian extinctions from epidemic disease driven by global warming. *Nature*, *439*(7073), 161-167.

Pyron, R.A., and Wiens, J.J. (2013) Large–scale phylogenetic analyses reveal the causes of high tropical amphibian diversity. *Proceedings of the Royal Society B: Biological Sciences,* 280, 20131622.

Quiroga–Carmona, M., and Woodman, N. (2015). A new species of *Cryptotis* (Mammalia, Eulipotyphla, Soricidae) from the Sierra de Perijá, Venezuelan–Colombian Andes. *Journal of Mammalogy*, *96*(4), 800–809.

Ramírez, N., Melfo, A., Resler, L.M., and Llambí, L.D. (2020). The end of the eternal snows: Integrative mapping of 100 years of glacier retreat in the Venezuelan Andes. *Arctic, Antarctic, and Alpine Research*, *52*(1), 563–581.

Ramírez–Villegas, J., Cuesta, F., Devenish, C., Peralvo, M., Jarvis, A., and Arnillas, C.A. (2014). Using species distributions models for designing conservation strategies of Tropical Andean biodiversity under climate change. *Journal for Nature Conservation, 22*(5), 391–404.

Ramos, V.E., Quispe, J.A., and Elías, R.K. (2019). Evaluación de la abundancia relativa de *Telmatobius culeus* en la zona litoral del lago Titicaca, Perú. *Revista Peruana de Biología*, *26*(4), 475–480.

Rangecroft, S., Harrison, S., and Anderson, K. (2015). Rock glaciers as water stores in the Bolivian Andes: an assessment of their hydrological importance. *Arctic, Antarctic and Alpine Research, 47(1)*, 89–98.

Raven, P. (2012). Prólogo. En: S.K. Herzog, R. Martínez, P. Jorgensen, and H. Tiessen (Eds.). *Cambio climático y biodiversidad en los Andes Tropicales*. (pp. vii–ix). Paris: IAI and SCOPE.

Red List of Threatened Species 2020: e.T172740470A172861187. Retrieved from https://dx.doi.org/10.2305/IUCN.UK.2020-2.RLTS.T172740470A172861187.en.

Redacción Medio Ambiente. (2020). El agua comienza a cotizar en el mercado de futuros de Wall Street. *El Espectador*. Retrieved from https://www.elespectador.com/noticias/medio-ambiente/agua-comienza-a-cotizar-en-el-mercado-de-wall-street/

Reid, W., Mooney, H., Cropper, A., Capistrano, D., Carpenter, S., Chopra, K., Dasgupta, P., Dietz, T., Duraiappah, A., Hassan, R., Kasperson, R., Leemans, R., May, R., McMichael, A., Pingali, P., Samper, C., Scholes, R., Watson, R., Zakri, A., Shidong, Z., …, and Zurek, M. (2005). *Evaluación de los ecosistemas del milenio. Informe de Síntesis*. Washington, D.C.: Secretariado de la Evaluación de los Ecosistemas del Milenio, Convenio de Diversidad Biológica. 43 p.

República Argentina (2016). *Primera revisión de su contribución determinada a nivel nacional*. Buenos Aires.

República Argentina (2017). *Plan de acción nacional de bosques y cambio climático*. Buenos Aires: Gabinete Nacional de Cambio Climático, Ministerio de Ambiente y Desarrollo Sustentable.

República Argentina (2019). *Plan nacional de adaptación y mitigación al cambio climático*. Buenos Aires: Gabinete Nacional de Cambio Climático, Ministerio de Ambiente y Desarrollo Sustentable.

República Argentina (2020). *Segunda contribución determinada a nivel nacional de la República Argentina*. Buenos Aires: Ministerio de Ambiente y Desarrollo Sostenible.

República Bolivariana de Venezuela (2017a). *Primera contribución nacionalmente determinada de la República Bolivariana de Venezuela para la lucha contra el cambio climático y sus efectos*. Caracas.

República Bolivariana de Venezuela (2017b). *Segunda comunicación nacional ante la Convención Marco de las Naciones Unidas sobre Cambio Climático*. Caracas.

República de Chile (2015). *Plan nacional de adaptación al cambio climático*. Santiago de Chile: Departamento de Cambio Climático, Ministerio del Medio Ambiente.

República de Chile (2020). *Contribución determinada a nivel nacional (NDC) de Chile. Actualización 2020*. Santiago de Chile: COP25 Scientific Committee.

República de Colombia (2016a). *Contribución prevista y determinada a nivel nacional NDC*. Bogotá: Ministerio de Ambiente y Desarrollo Sostenible.

República de Colombia (2016b). *Plan nacional de adaptación al cambio climático.* Líneas de acción prioritarias para la adaptación al cambio climático en Colombia. Bogotá: Departamento Nacional de Planeación, Ministerio de Ambiente y Desarrollo Sostenible, IDEAM and UNGRD.

República de Colombia (2020). *NDC de Colombia – actualización 2020, versión para consulta pública octubre de 2020.* Bogotá: Ministerio de Ambiente y Desarrollo Sostenible.

República de Ecuador (2016). *Bosques para el buen vivir – Plan de acción REDD+ Ecuador (2016–2025)*. Quito: Ministerio del Ambiente.

República de Ecuador (2019). *Primera contribución determinada a nivel nacional para el acuerdo de París bajo la Convención Marco de Naciones Unidas Sobre Cambio Climático*. Quito: Ministerio del Ambiente.

República del Perú (2016). *La contribución nacional del Perú – NDC: agenda para un desarrollo climáticamente responsable*. Lima: Ministerio del Ambiente. Dirección General de Cambio Climático, Desertificación y Recursos Hídricos.

República del Perú (2019). *Indicadores de brecha de infraestructura o acceso a servicios públicos del sector ambiental 2019–2021*. Lima: Ministerio del Ambiente.
República del Perú (2020a). *Contribuciones determinadas a nivel nacional del Perú. Reporte de actualización periodo 2021 – 2030*. Lima: Ministerio del Ambiente.
República del Perú (2020b). *Lineamientos para la identificación y clasificación de las acciones REDD+.* Lima: Ministerio del Ambiente.
Retamal, C., and Gutiérrez, E. (2020). *Análisis del estado de situación de la implementación de la Contribución Nacionalmente Determinada (NDC) de Bolivia y recomendaciones para su actualización*. La Paz: Ministerio de Planificación del Desarrollo, MPD and Ministerio de Medio Ambiente y Agua, MMAyA.
Reyes J. H. and Gomez C. (2018). *Mitigación de emisiones provenientes de la ganadería en la región andina.* Instituto Interamericano de Cooperación para la Agricultura, Universidad Nacional Agraria la Molina. Lima: IICA, 2018.
Reynel, C., Pennington, R.T., and Särkinen, T. (2013). *Cómo se formó la diversidad ecológica del Perú*. Lima, Imprenta Bellido. 472 p.
Ricketts, T.H., Dinerstein, E., Boucher, T., Brooks, T.M., Butchart, S.H.M., Hoffmann, M., …. and Wikramanayake, E. (2005) Pinpointing and preventing imminent extinctions. *Proceedings of the National Academy of Sciences,* 102, 18497-18501.
Ricklefs, R. E. (2004). A comprehensive framework for global patterns in biodiversity. *Ecology Letters* 7, 1-15.
Rivas-Ortega, H. 2018. Ecoturismo en Chile: Desafíos de una década de crecimiento en las áreas protegidas del Estado. CONAF. http://journals.openedition.org/etudescaribeennes/13161
Roberts, N. (2009). *Culture and landslide risk in the Central Andes of Bolivia and Peru.* Studia Universitatis Babeş-Bolyai, Geologia 54: 55-59.
Rodríguez, L.O., and Catenazzi, A. (2017). Four new species of terrestrial-breeding frogs of the genus *Phrynopus* (Anura: Terrarana: Craugastoridae) from Río Abiseo National Park, Peru. *Zootaxa*, *4273*(3), 381–406.
Rodríguez–Pacheco, F.L., Jiménez–Villamizar, M.P., and Pedraza–Álvarez, L.P. (2019). Efectos del cambio climático en la salud de la población colombiana. *Duazary*, *16*(2), 319–331.
Rojas, B.G. (2018). *Efecto de la pérdida de especies en redes de interacción 'planta–colibrí' en el bosque alto andino Yanacocha, faldas del volcán Pichincha, Ecuador*. Disertación para obtener el título de Licenciado en Ciencias Biológicas. Quito: Pontificia Universidad Católica de Ecuador.
Rolando, J.L., Dubeux, J.C., Jr, Pérez, W., Ramírez, D.A., Turin, C., Ruiz–Moreno, M., Comerford, N.B., Mares, V., Garcia, G. and Quiroz, R. (2017). Soil organic carbon stocks and fractionation under different land uses in the Peruvian high–Andean Puna. *Geoderma*, *307*, 65–72.
Ron, S.R. (2000) Biogeographic area relationships of lowland Neotropical rainforest based on raw distributions of vertebrate groups. *Biological Journal of the Linnean Society, 71*(3), 379–402.
Ron, S.R., Carrión, J., Caminer, M.A., Sagredo, Y., Navarrete, M.J., Ortega, J.A., Varela–Jaramillo, A., Maldonado–Castro, G., and Terán, C. (2020). Three new species of frogs of the genus Pristimantis (Anura, Strabomantidae) with a redefinition of the P. lacrimosus species group. *ZooKeys*, *993*, 121–155.
Roskov, Y., Abucay, L., Orrell, T., Nicolson, D., Bailly, N., Kirk, P.M., Bourgoin, T., DeWalt, R.E., Decock, W., De Wever, A., Nieukerken, E. van, Zarucchi, J., and Penev, L. (Eds.). (2019). Catalogue of Life, 2019 Annual Checklist. Leiden, The Netherlands: Species 2000 & ITIS.
Rostworowski, M. (1993). *Ensayos de historia andina: elites, etnias, recursos*. Lima: IEP. 132 p.
Rozas–Dávila, A., Valencia, B.G., and Bush, M.B. (2016). The functional extinction of Andean megafauna. *Ecology, 97*(10), 2533–2539.

Rubio, M.C., C. Rubio, M. Salomón and E. Abraham. (2017). Conservation of ecosystem services in high-altitude Andean wetlands: social participation in the creation of a natural protected area. *Ecol Austral* 27:177-192.

Ruiz, D., Moreno, H.A., Gutiérrez, M.E., and Zapata, P.A. (2008). Changing climate and endangered high mountain ecosystems in Colombia. *Science of the Total Environment, 398*(1–3), 122–132.

Ruíz, M., García, C., and Sayer, J.A. (2007). Los servicios ambientales de los bosques. *Ecosistemas*, *16*(3), 81–90.

Saavedra, C., and Freese, C. (1986). *Prioridades biológicas de conservación en los Andes tropicales.* Parks/Parques/Parcs 11: 8-11.

Saatchi, S.S., Harris, N.L., Brown, S., Lefsky, M., Mitchard, E., Salas, W., Zutta, B., Buermann, W., Lewis, S., Hagen, S., Petrova, S., White, L., Silman, M. and Morel A. (2011). Benchmark map of forest carbon stocks in tropical regions across three continents. *Proceedings of the National Academy of Sciences 108*(24): 9899–9904.

Salazar, L., Homeier, J., Kessler, M., Abrahamczyk, S., Lehnert, M., Krömer, T., and Kluge, J. (2015). Diversity patterns of ferns along elevational gradients in Andean tropical forests. *Plant Ecology & Diversity, 8*(1), 13-24, DOI:10.1080/17550874.2013.843036

Salo, J. (1993). *Notas en la historia de la exploración científica y teorías en la selva baja de la Amazonia peruana*. En: R. Kalliola, M. Puhakka, and W. Danjoy (eds.). Amazonia peruana. Vegetacíon húmeda tropical en el llano subandino (pp. 23–31). Lima: Proyecto Amazonia, Univesidad de Turku and ONERN.

Salzman, J., Bennett, G., Carroll, N., Goldstein, A., and Jenkins, M. (2018). The global status and trends of payments for ecosystem services. *Natural Sustainability 1*(3), 136–144.

Samaniego, J., Alatorre, J.E., Reyes, O., Ferrer, J., Muñoz, L., and Arpaia, L. (2019). *Panorama de las contribuciones determinadas a nivel nacional en América Latina y el Caribe, 2019: avances para el cumplimiento del Acuerdo de París*. Santiago de Chile: CEPAL.

Sánchez, L., and Reyes, O. (2015). Medidas de adaptación y mitigación frente al cambio climático en América Latina y el Caribe: Una revisión general. *Estudios del cambio climático en América Latina*. Santiago de Chile: CEPAL.

Sánchez–Nivicela, J.C., Urgiles, V.L., Navarrete, M.J., Yanez–Munoz, M.H., and Ron, S. (2019). A bizarre new species of *Lynchius* (Amphibia, Anura, Strabomantidae) from the Andes of Ecuador and first report of *Lynchius parkeri* in Ecuador. *Zootaxa*, *4567*(1), 1–24.

Sánchez, V.H. Zambrano J.L. Iglesias C. (eds) (2019). *La cadena de valor del cacao en América Latina y El Caribe*. Fontagro, Espol, INIAP. Quito, Ecuador.

Sarmiento, J., Bigorne, R., and Carvajal–Vallejos, F.M. (Eds.). (2018). *Peces de Bolivia. Bolivian fishes*. La Paz: IRD Éditions.

Sayer, J., Sunderland, T., Ghazoul, J., Pfund, J.L., Sheil, D., Meijaard, E., Venter, M., Boedhihartono, A.K., Day, M., García, C., van Oosten, C., and Buck, L.E. (2013). Ten principles for a landscape approach to reconciling agriculture, conservation, and other competing land uses. *Proceeding of the National Academy of Sciences*, 110(21), 8349-8356.

Scheele, B. C., Pasmans, F., Skerratt, L. F., Berger, L., Martel, A. N., Beukema, W., ... and De la Riva, I. (2019). Amphibian fungal panzootic causes catastrophic and ongoing loss of biodiversity. *Science*, *363*(6434), 1459-1463.

Schipper, J., Chanson, J.S., Chiozza, F., Cox, N.A., Hoffmann, M., Katariya, V., Lamoreux, J., Rodrigues, A.S.L., Stuart, S.N., Temple, H.J., Baillie, J., Boitani, L., Lacher, T.E., Jr, Mittermeier, R.A., Smith, A.T., Absolon, D., Aguiar, J.M., Amori, G., Bakkour, N., Baldi, …, and Young, B.E. (2008) The status of the World's land and marine mammals: diversity, threat, and knowledge. *Science, 322*, 225–230.

Schneider, A. (2011). Eruptive processes, mineralization and isotopic evolution of the Los Frailes Karikari region, Bolivia. *Andean Geology, (30)*, 27–33.
Schoolmeester, T., Saravia, M., Andresen, M., Postigo, J., Valverde, A., Jurek, M., Alfthan, B., and Giada, S. (2016) *Outlook on climate change adaptation in the Tropical Andes mountains.* Mountain Adaptation Outlook Series. Nairobi: United Nations Environment Program.
Schorr, B. Valencia, D., Hector, G., and Velásquez-Castellanos, I., (eds) (2018). *Crecimiento, desigualdad y los retos para la sostenibilidad: En un escenario post-boom en la región andina*. La Paz: Konrad Adenauer Foundation / trAndeS.
Schumacher, Cazcarro, Duarte, Sarasa, Serrano, Xepapadeas, Freire-Gonzalez, Vivanco, Pena-Levano, Escalante, Shehabi, Koundouri, Pittis, Samartzis, Ing, Nicola, Laude, Brule-Gapihan, Cohen, Schwarz, Li, Lu, Jani. (2020) Perspectives on the Economics of the Environment in the Shadow of Coronavirus 76 . 447 - 517 DOI: 10.1007/s10640-020-00462-9
Scott, D.A., and Carbonell, M. (1986). A directory of Neotropical wetlands. Gland and Cambridge: IUCN. 684 p.
Seimon, T.A., Seimon, A., Yager, K., Reider, K., Delgado, A., Sowell, P., Tupayachi, A., Konecky, B., McAloose, D., and Halloy, S. (2017). Long–term monitoring of tropical alpine habitat change, Andean anurans, and chytrid fungus in the Cordillera Vilcanota, Peru: Results from a decade of study. *Ecology and Evolution, 7*(5), 1527–1540.
SERNANP (Servicio Nacional de Áreas Naturales Protegidas por el Estado) (2018) Estrategia de Lucha contra la Minería Ilegal en Áreas Naturales Protegidas de Administración Nacional (2017-2021)
Serrano-Villavicencio, J. E., and Silveira, L. F. (2019). Notes on *Lagothrix flavicauda* (Primates: Atelidae): oldest known specimen and the importance of the revisions of museum specimens. *Zoologia* (Curitiba), 36.
Shepack, A., von May, R., Ttito, A., and Catenazzi, A. (2016). A new species of *Pristimantis* (Amphibia, Anura, Craugastoridae) from the foothills of the Andes in Manu National Park, southeastern Peru. *ZooKeys*, *594,* 143–164.
Shukla, P.R., Skea, J., Calvo, E., Masson–Delmotte, V., Portner, H.O., Roberts, D.C., Zhai, P., Slade, R., Connors, S., van Diemen, R., Ferrat, M., Haughey, E., …, and Malley, J. (Eds.) (2020). *Climate change and land. An IPCC special report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems*. Geneva: Intergovernmental Panel on Climate Change, IPCC.
Sichra, I. (2009). "Andes". En: *Atlas sociolingüístico de pueblos indígenas en América Latina*. Inge Sichra (ed.)., 513-644. Cochabamba: unicef, funproeib.
Sierra, R., O. Calva y A. Guevara (2020). Zonas de Procesos Homogéneos de Deforestación del Ecuador. Factores promotores y tendencias regionales. PROAmazonia y Ministerio del Ambiente y Agua. Quito, Ecuador.
Smith, B. T., McCormack, J. E., Cuervo, A. M., Hickerson, M. J., Aleixo, A., Cadena, C. D., ... and Faircloth, B. C. (2014). The drivers of tropical speciation. *Nature*, *515*(7527), 406-409.
Solari, S. (2016). *Saccopteryx antioquensis*. The IUCN Red List of Threatened Species 2016: e.T136420A21985022. Retrieved from https://dx.doi.org/10.2305/IUCN.UK.2016-1.RLTS.T136420A21985022.en.
Soruco, A., Vincent, C., Francou, B., and González, J.F. (2009). Glacier decline between 1963 and 2006 in the Cordillera Real, Bolivia. *Geophysical Research Letters*, *36*(3).
Stefoni, C. (2018) Panorama de la migración internacional en América del Sur. CEPAL-Naciones Unidas. Available at: https://repositorio.cepal.org/bitstream/handle/11362/43584/1/S1800356_es.pdf
Stern, C. (2004) Active andean volcanism: its geologic and tectonic setting. *Revista Geológica de Chile, 31,* 161–206.

Stiles, F.G., Laverde–R., O., and Cadena, C.D. (2017). A new species of tapaculo (Rhinocryptidae: *Scytalopus*) from the Western Andes of Colombia. *The Auk*, *134*(2), 377–392.

Stuart, S. N., Chanson, J. S., Cox, N. A., Young, B. E., Rodrigues, A. S., Fischman, D. L., and Waller, R. W. (2004). Status and trends of amphibian declines and extinctions worldwide. *Science*, *306*(5702), 1783-1786.

Sthioul, A.E. (2015). *Aportes de la minería a Chile y Perú: Interacción con la sociedad* (Tesis magíster). Universidad de Chile, Santiago. 73 p.

Ströbele–Gregor, J. (2013). El proyecto estatal del litio en Bolivia: Expectativas, desafíos y dilemas. *Nueva Sociedad, 244*, 74–83.

Suárez, D., Acurio, C., Chimbolema, S., and Aguirre, X. (2016). Análisis del carbono secuestrado en humedales altoandinos de dos áreas protegidas del Ecuador. *Ecología Aplicada*, *15*(2), 171–177.

SZF (2020) Diagnóstico que evalúa la presencia de actividad minera aurífera y sus impactos a nivel de tres corredores, así como áreas naturales protegidas vinculadas, en el hotspot andes tropicales del Perú. Final Report.

Székely, P., Eguiguren, J. S., Ordóñez-Delgado, L., Armijos-Ojeda, D., Székely, D. (2020). Fifty years after: A taxonomic revision of the amphibian species from the Ecuadorian biodiversity hotspot Abra de Zamora, with description of two new *Pristimantis* species. *PLOS ONE, 15*(9), e0238306. Retrieved from: https://doi.org/10.1371/journal.pone.0238306

Tapia, E. (2020) Agroecología de los cultivos andinos subexplotados. Downloaded from: http://www.fao.org/tempref/GI/Reserved/FTP_FaoRlc/old/prior/segalim/prodalim/prodveg/cdrom/contenido/libro10/cap02.htm

Tejedor, N., Álvarez, E., Arango, S., Araujo, A., Blundo, C., Boza, T.E., La Torre, M.A., Gaviria, J., Gutiérrez, N., Jørgensen, P.M., León, B., López, R., Malizia, L., Millán, B., Moraes, M., Pacheco, S., Rey, J.M., Reynel, C., Timaná, M., Ulloa, C., Vacas, O. and Newton, A.C. (2012) Evaluación del estado de conservación de los bosques montanos en los Andes Tropicales. *Ecosistemas 21*(1–2), 148–166.

Tejedor, N., Newton, A.C., Golicher, D., and Oldfield, S. (2015). The relative impact of climate change on the extinction risk of tree species in the montane Tropical Andes. *PLoS One, 10*(7), e0131388.

The best way to solve the world's water woes is to use less of it. (2019). *The Economist*. Retrieved from: https://www.economist.com/special-report/2019/02/28/the-best-way-to-solve-the-worlds-water-woes-is-to-use-less-of-it

Tierra Digna, Melo, D. (2015), La Minería en Chocó, en Clave de Derechos. Investigación y propuestas para convertir la crisis socio-ambiental en paz y justicia territorial. 20-21. Available at: https://tierradigna.org/pdfs/LA%20MINERIA%20EN%20CHOCO_web.pdf

Tiessen, H. (2012). Notas sobre el paleoclima. En: S.K. Herzog, R. Martínez, P. Jorgensen, and H. Tiessen (Eds.). *Cambio climático y biodiversidad en los Andes Tropicales*. (p. 113–116). Paris: IAI and SCOPE.

Timm, R.M., Pine, R.H., and Hanson, J D. (2018). A new species of *Tanyuromys* Pine, Timm, and Weksler, 2012 (Cricetidae: Oryzomyini), with comments on relationships within the Oryzomyini. *Journal of Mammalogy*, *99*(3), 608–623.

Timms, J., Chaparro, J.C., Venegas, P.J., Salazar–Valenzuela, D., Scrocchi, G., Cuevas, J., Leynaud, G. and Carrasco, P.A. (2019). A new species of pitviper of the genus *Bothrops* (Serpentes: Viperidae: Crotalinae) from the Central Andes of South America. *Zootaxa*, *4656*(1), 99–120.

Tirira, D. (2013). Tráfico de primates nativos en el Ecuador. Boletín Técnico 11. Serie Zoológica 8-9: 36-57.

Tito, R., Vasconcelos, H.L., and Feeley, K.J. (2018). Global climate change increases risk of crop yield losses and food insecurity in the Tropical Andes. *Global Change Biology*, *24*(2), e592-e602.

Tognelli, M.F., Anderson, E.P., Jiménez–Segura, L. F., Chuctaya, J., Chocano, L., Maldonado–Ocampo, J.A., Mesa–Salazar, L., Mojica, J., Carvajal–Vallejos, F.M., Correa, V., Ortega, H., …, and Villa–Navarro, F.A. (2018). Assessing conservation priorities of endemic freshwater fishes in the Tropical Andes region. *Aquatic Conservation: Marine and Freshwater Ecosystems*, *29*(7), 1123–1132.

Tognelli, M.F., Lasso, C.A., Bota–Sierra, C.A., Jiménez-Segura, L.F., and Cox, N.A. (Eds.). (2016). *Estado de conservación y distribución de la biodiversidad de agua dulce en los Andes Tropicales*. Gland, Suiza: UICN. 199 p.

Torres–Carvajal, O., Echevarría, L.Y., Venegas, P.J., Chávez, G., and Camper, J.D. (2015). Description and phylogeny of three new species of *Synophis* (Colubridae, Dipsadinae) from the tropical Andes in Ecuador and Peru. *ZooKeys*, (546), 153–179.

Torres-Carvajal, O., Lobos, S. E., Venegas, P. J., Chávez, G., Aguirre-Peñafiel, V., Zurita, D., and Echevarría, L. Y. (2016). Phylogeny and biogeography of the most diverse clade of South American gymnophthalmid lizards (Squamata, Gymnophthalmidae, Cercosaurinae). *Molecular phylogenetics and evolution*, *99*, 63-75.

Torres–Carvajal, O., Venegas, P.J., and De Queiroz, K. (2015). Three new species of woodlizards (Hoplocercinae, *Enyalioides*) from northwestern South America. *ZooKeys, 494*, 107–132.

Torres–Carvajal, O., Venegas, P.J., and Nunes, P.M.S. (2020). Description and Phylogeny of a new species of andean lizard (Gymnophthalmidae: Cercosaurinae) from the Huancabamba Depression. *South American Journal of Herpetology*, *18*(1), 13–23.

Tosi, J.A. (1960). Zonas de vida natural en el Perú. Lima: Instituto Interamericano de Ciencias Agrícolas. Boletín Técnico No 5, 1–271.

Tovar, C., Arnillas, C.A., Cuesta, F., and Buytaert, W. (2013). Diverging responses of tropical Andean biomes under future climate conditions. *PLoS One*, *8*(5), e63634.

Tovar, C., Duivenvoorden, J.F., Sánchez–Vega, I., and Seijmonsbergen, A.C. (2012). Recent changes in patch characteristics and plant communities in the jalca grasslands of the Peruvian Andes. *Biotropica,* 44, 321–330.

Tovar, A., Tovar, C., Saito, J., Soto, A., Regal, F., Cruz, Z., Véliz, C., Vásquez, P., and Rivera, G. (2010). *Yungas Peruanas–bosques montanos de la vertiente oriental de los Andes del Perú. Una perspectiva ecorregional de la conservación*. Lima: Punto Impreso S.A.

Trivelli, C., and Berdegué, J.A.. (2019). *Transformación rural. Pensando en el futuro de América Latina y el Caribe. 2030 - Alimentación, agricultura y desarrollo rural en América Latina y el Caribe*, No. 1. FAO. Santiago de Chile.

Turetsky, M. R., Benscoter, B., Page, S., Rein, G., Van Der Werf, G. R., and Watts, A. (2015). Global vulnerability of peatlands to fire and carbon loss. *Nature Geoscience*, *8*(1), 11-14.

Tyler, S., and Keller, M. (2013). R*esiliencia climática y seguridad alimentaria: Un marco para la planificación y el monitoreo*. Manitoba, Canadá: International Institute for Sustainable Development (IISD)

UICN (International Union for Conservation of Nature) (2020) Declaración de la UICN sobre la pandemia del Covid- 19. Descargado de https://www.iucn.org/es/news/secretaria/202004/declaracion-de-la-uicn-sobre-la-pandemia-de-covid-19.

UNASUR (Unión de Naciones Suramericanas) (2017). Consejo Suramericano de Infraestructura y Planeamiento (COSIPLAN), Cartera de Proyectos 2017. Unión de Naciones Suramericanas. Quito.

UNCTAD (United Nations Conference on Trade and Development) (2020). World investment report 2020, international production beyond the pandemic: key messages and overview. United Nations. 2020

UNDP (United Nations Development Programme) (2019). Human development

report 2019. United Nations *Development Programme*. New York, United States.
UNEP-WCMC and IUCN (UN Environment Programme World Conservation Monitoring Centre) (2016). Protected Planet Report 2016. UNEP-WCMC and IUCN: Cambridge UK and Gland, Switzerland.
UNESCO (United Nations Educational, Scientific and Cultural Organization) (2019). Informe de seguimiento de la educación en el mundo: Migración, desplazamientos y educación: construyendo puentes, no muros.
UNWTO (World Tourism Organization). 2019. *Panorama of international tourism, 2019 edition.* ISBN: 978-92-844-2122-0. https://www.e-unwto.org/doi/pdf/10.18111/9789284421237
UNWTO (World Tourism Organization). 2019. *Global Report on Women in Tourism - Second Edition.* Madrid. (2020). World Tourism Barometer, vol. 18, N° 2, May
Urbina–Cardona, J.N. (2011). Gradientes andinos en la diversidad y patrones de endemismo en anfibios y reptiles de Colombia: Posibles respuestas al cambio climático. *Revista Facultad de Ciencias Básicas*, *7*(1), 74–91.
Uribe, E. (2015). *El cambio climático y sus efectos en la biodiversidad en América Latina*. Santiago de Chile: Comisión Económica para América Latina y el Caribe (CEPAL).
Urquijo S. A. (2017) *Una pequeña joya en peligro*. Retrieved from Recuperado de http://www.udea.edu.co/wps/portal/udea/web/inicio/udea-noticias/udea-noticia/?page=udea.inicio.udea.noticias.noticia&urile=wcm%3Apath%3A%2FPortalUdeA%2FasPortalUdeA%2FasHomeUdeA%2FUdeA%2BNoticias%2FContenido%2FasNoticias%2FCiencia%2Funa-pequena-joya-peligro
Vanhulst, J. (2015). *El laberinto de los discursos del buen vivir: entre sumak kawsay y socialismo del siglo XXI.* Polis. Revista Latinoamericana, vol. 14, No. 40.
Vargas, O., and Ávila, L.A. (2017). Riesgos y efectos del cambio climático en la región altoandina. En: A.L. González (Ed.). Biodiversidad y cambio climático en Colombia: Avances, perspectivas y reflexiones. (p. 65–75). Bogotá: Botanical Garden of Bogotá José Celestino Mutis.
Velez-Liendo, X. and García-Rangel, S. 2017. *Tremarctos ornatus* (versión de erratas publicada en 2018). La Lista Roja de Especies Amenazadas de la UICN 2017: e.T22066A123792952. Retrieved from https://dx.doi.org/10.2305/IUCN.UK.2017-3.RLTS.T22066A45034047.en
Venegas, P.J., Echevarría, L.Y., García–Ayachi, L.A., and Landauro, C.Z. (2020). Two new sympatric species of *Stenocercus* (Squamata: Iguania) from the inter–Andean valley of the Mantaro River, Peru. *Zootaxa*, *4858*(4), 555–575.
Venegas, P.J., Echevarría, L.Y., García–Burneo, K., and Koch, C. (2016). A new species of iguanid lizard, genus *Stenocercus* (Squamata, Iguania), from the Central Andes in Peru. *Zootaxa*, *4205*(1), 52–64.
Venegas, P.J., Echevarría, L.Y., Lobos, S.E., Nunes, P.S., and Torres–Carvajal, O. (2016). A new species of Andean microteiid lizard (Gymnophthalmidae: Cercosaurinae: *Pholidobolus*) from Peru, with comments on *P. vertebralis*. *Amphibian & Reptile Conservation*, *10*(1), 21–33.
Venegas, P.J., García–Ayachi, L.A., Chávez–Arribasplata, J.C., Chávez, G., Wong, I., and García–Bravo, A. (2020). Four new species of *Stenocercus* Duméril and Bibron, 1837 (Squamata, Iguania) from the Department of Amazonas in northeastern Peru. *Evolutionary Systematics*, *4*, 79–108.
Verified Carbon Standard (2020). *Project and Credit Summary*. Downloaded from: https://registry.verra.org/app/search/VCS.
Vilela, T., A. Malky Harb, A. Bruner, V. Laísa da Silva Arruda, V. Ribeiro, A A. Costa Alencar, A. J. Escobedo Grandez, A. Rojas, A. Laina, and R. Botero, (2020). A better Amazon road network for people and the environment. Magazine Proceedings of the National Academy of Sciences (PNAS)
Villamizar, A., Buroz, E., Lairet, R., and Gómez, J. (Eds.) (2018). *Lineamientos y estrategias transversales y sectoriales para enfrentar el cambio climático en*

Venezuela (LETS). Caracas: Secretaría Académica de Cambio Climático ACFIMAN, Academia de Ciencias Físicas, Matemáticas y Naturales de Venezuela.
Villwock, W. (1994). Consecuencias de la introducción de peces exóticos sobre las especies nativas del lago Titicaca. *Ecología en Bolivia, 23*, 49–56.
Vuille, M., Carey, M., Huggel, C., Buytaert, W., Rabatel, A., Jacobsen, D., Soruco, A., Villacis, M., Yarlequé, C., Timm, O.E., Condom, T., Salzmann, N. and Sicart, J.E. (2018). Rapid decline of snow and ice in the Tropical Andes – Impacts, uncertainties and challenges ahead. *Earth–Science Reviews, 176*, 195–213.
Waddell, E. H., Crotti, M., Lougheed, S. C., Cannatella, D. C., and Elmer, K. R. (2018). Hierarchies of evolutionary radiation in the world's most species rich vertebrate group, the Neotropical *Pristimantis* leaf litter frogs. *Systematics and biodiversity*, *16*(8), 807-819.
Wallace, R.B., Reinaga, A., Piland, N., Piana, R., Vargas, H., Zegarra, R.E., Alarcón, P., Alvarado, S., Álvarez, J., Angulo, F., Astore, V., Ciri, F., Cisneros, J., Cóndor, C., Escobar, V., Funes, M., Gálvez–Durand, J., Gargiulo, C., Gordillo, S., Heredia, J., …, and Zurita. L. (2019). *Protegiendo el símbolo de los Andes: Un ejercicio de priorización a lo largo del rango del Cóndor Andino (Vultur gryphus)*. La Paz: Wildlife Conservation Society. 196 p.
Walsh, J. (2004). *Fair trade in the fields: outcomes for Peruvian coffee producers*. Master's thesis. Cambridge, MA: Massachusetts Institute of Technology.
Wassenaar, T., Gerber, P., Verburg, P. H., Rosales, M., Ibrahim, M., and Steinfeld, H. (2007). Projecting land use changes in the Neotropics: The geography of pasture expansion into forest. *Global Environmental Change*, *17*(1), 86-104.
WCS (Wildlife Conservation Society) (2020) https://peru.wcs.org/es-es/WCSPeru/Noticias/articleType/ArticleView/articleId/14016/La-relacion-entre-el-comercio-ilegal-de-fauna-silvestre-y-la-salud-humana.aspx
WCS, FZS & FCDS, (2020). Estrategia regional para enfrentar la presencia de actividad minera aurífera ilegal en el hotspot Andes Tropicales: Bolivia - Colombia - Ecuador - Peru. Lima, Peru. 33 p.
Weigend, M. (2002) Observations on the biogeography of the Amotape–Huancabamba zone in northern Peru. *Botanical Review,* 68, 38–54.
Weigend, M. (2004). Observaciones adicionales sobre la biogeografía de la zona de Amotape–Huancabamba en el norte del Perú. *Revista Peruana de Biología*, 11(2), 127–134.
Weigend, M., Cano, A. and Rodríguez, E.F. (2005). New species and new records of the flora in Amotape–Huancabamba zone: endemics and biogeographic limits. *Revista Peruana de Biología, 12*(2), 249–274.
White, C. (2020). Why Regenerative Agriculture? *American Journal of Economics and Sociology*, 79(3), 799-812.
Wilsey, C., Wu, J., Taylor, L., Voskamp, A., Willis, S., Linares–Romero, L.G., Avellaneda, F., Abril, I., Ochoa, D., and Butchart, S. (2019). Proyectando el impacto del cambio climático sobre la avifauna de áreas protegidas: el caso del Parque Nacional Natural Chingaza, Colombia. *Revista Yu'am, 3*(6), 4–21.
World Bank. (2020). The economy in the time of COVID-19. Semiannual report for the Latin America and the Caribbean region. World Bank, April 2020.
World Bank. (2019). *World Development Indicators*. Available online: https://databank.worldbank.org/source/worlddevelopment-indicators.
WWF (World Wildlife Fund) (2020) Living Planet Report 2020 - Bending the curve of biodiversity loss. Almond, R.E.A., Grooten M. and Petersen, T. (Eds). WWF, Gland, Switzerland.
Yacobaccio, H.D., and Morales, M.R. (2011). Ambientes pleistocénicos y ocupación humana temprana en la Puna argentina. *Boletín de arqueología PUCP*, (15), 337–356.
Yánez–Muñoz, M.H., Reyes–Puig, C., Reyes–Puig, J.P., Velasco, J.A., Ayala Varela, F., and Torres–Carvajal, O. (2018). A new cryptic species of *Anolis* lizard from

northwestern South America (Iguanidae, Dactyloinae). *ZooKeys, 794*, 135–163.
Yaranga, R.M., and Custodio, M. (2013). Almacenamiento de carbono en pastos naturales altoandinos. *Scientia Agropecuaria*, *4*(4), 313–319.
Yépez-García, A.l; J. Yi, M. Carvalho, M. Hallack, and D.D. López Soto (2018). The Energy Path of Latin America and the Caribbean. IDB.
Young, K. (2012). Introducción a la geografía andina. En: S.K. Herzog, R. Martínez, P. Jorgensen, and H. Tiessen (Eds.). *Cambio climático y biodiversidad en los Andes Tropicales*. (pp. 151–154). Paris: IAI and SCOPE.
Young, B., Young, K. R., and Josse, C. (2011). Vulnerability of tropical Andean ecosystems to climate change. *Climate Change and Biodiversity in the Tropical Andes. Inter-American Institute for Global Change Research (IAI) and Scientific Committee on Problems of the Environment (SCOPE)*, 170-181.
Young, B., Young, K., and Josse, C. (2012). Vulnerabilidad de los ecosistemas de los Andes Tropicales al cambio climático. En: S.K. Herzog, R. Martínez, P. Jorgensen, y H. Tiessen (Eds.). *Cambio climático y biodiversidad en los Andes Tropicales*. (p. 195–208). Paris: IAI and SCOPE.
Young, K., and Valencia, N. (1992). Introducción: Los bosques montanos del Perú. *Memorias del Museo de Historia Natural UNMSM 21*, 5–9.
Zavaleta, E. H. Z. (2017). *Puya raimondii* Harms del Santuario Nacional de Calipuy. *Revista de Glaciares y Ecosistemas de Montaña*, (3), 7-7.
Zevallos, S., Elías, R.K., Berenguel, R.A., Weaver, T.J., and Reading, R.P. (2016). *Batrachochytrium dendrobatidis* in confiscated Telmatobius in Lima, Peru. *Journal of Wildlife Diseases*, *52*(4), 949–952.
Zeballos, H., Pino, K., Medina, C.E., Pari, A., Chávez, D., Tinoco, N., and Ceballos, G. (2018). A new species of small-eared shrew of the genus *Cryptotis* (Mammalia, Eulipotyphla, Soricidae) from the northernmost Peruvian Andes. *Zootaxa*, *4377*(1), 51–73.

17. APPENDICES

Appendix 5.1. Species Outcomes for the Tropical Andes Hotspot

This appendix provides a list of all globally threatened species in the Tropical Andes Hotspot that were used for the relative biodiversity value (RBV) analysis presented in Chapter 5. The methodology used to calculate the RBV is described in Appendix 5.4.

Table 5.1.1. Amphibians

Scientific name	Global threat IUCN	English name (if available)	Argentina	Bolivia	Chile	Peru	Ecuador	Colombia	Venezuela
Agalychnis litodryas	VU	Pink-sided Treefrog					X		
Allobates alessandroi	EN	Rocket Frog				X			
Allobates bromelicola	VU	Coastal Rocket Frog							X
Allobates cepedai	VU							X	
Allobates humilis	VU								X
Allobates ignotus	EN	Nurse Frog of Serranía de Perijá						X	
Allobates juanii	EN							X	
Allobates kingsburyi	EN						X		
Allobates mandelorum	EN	Oriental Toad Nanny							X
Allobates picachos	EN							X	
Ameerega bassleri	VU	Pleasing Poison Frog				X			
Ameerega pepperi	VU					X			
Ameerega planipaleae	CR	Oxapampa Poison Frog				X			
Ameerega pongoensis	VU					X			
Ameerega rubriventris	EN	Poison Frog				X			
Ameerega shihuemoy	EN					X			
Ameerega silverstonei	EN	Silverstone's Poison Frog				X			
Andinobates bombetes	VU	Cauca Poison Frog						X	
Andinobates daleswansoni	EN							X	
Andinobates dorisswansonae	VU							X	
Andinobates opisthomelas	VU	Andean Poison Frog						X	
Andinobates tolimensis	VU							X	
Andinobates victimatus	EN							X	
Andinobates virolinensis	VU	Santander Poison Frog						X	
Aromobates alboguttatus	EN	Whitebelly Rocket Frog							X
Aromobates duranti	EN	Durant's Rocket Frog							X
Aromobates haydeeae	EN	El Vivero Rocket Frog							X
Aromobates leopardalis	CR	Leopard Rocket Frog							X
Aromobates mayorgai	EN	Mayorga Rocket Frog							X
Aromobates meridensis	CR	Merida Rocket Frog							X
Aromobates molinarii	EN	Las Playitas Rocket Frog							X
Aromobates nocturnus	CR	Skunk Frog							X
Aromobates orostoma	EN	Tachira Rocket Frog							X
Aromobates saltuensis	EN	Salty Rocket Frog							X
Aromobates serranus	EN	Pefaur's Rocket Frog							X
Atelopus arsyecue	CR	Starry Night Harlequin Toad						X	
Atelopus arthuri	CR	Arthur's Stubfoot Toad					X		

Scientific name	Global threat IUCN	English name (if available)	Argentina	Bolivia	Chile	Peru	Ecuador	Colombia	Venezuela
Atelopus balios	CR	Pescado River Stubfoot Toad					X		
Atelopus bomolochos	CR	Azuay Stubfoot Toad					X		
Atelopus boulengeri	CR	Boulenger's Stubfoot Toad					X		
Atelopus carbonerensis	CR	La Carbonera Stubfoot Toad							X
Atelopus carrikeri	EN	Guajira Stubfoot Toad						X	
Atelopus chrysocorallus	CR								X
Atelopus coynei	CR	Faisanes River Stubfoot Toad					X		
Atelopus cruciger	CR	Veragua Stubfoot Toad							X
Atelopus elegans	EN	Elegant Stubfoot Toad					X		
Atelopus epikeisthos	EN					X			
Atelopus eusebianus	CR	Malvasa Stubfoot Toad						X	
Atelopus exiguus	EN						X		
Atelopus famelicus	CR							X	
Atelopus ignescens	CR	Quito Stubfoot Toad					X		
Atelopus laetissimus	EN							X	
Atelopus longibrachius	EN	El Tambo Stubfoot Toad						X	
Atelopus lozanoi	EN	Lynch's Stubfoot Toad						X	
Atelopus marinkellei	EN							X	
Atelopus mittermeieri	EN							X	
Atelopus mucubajiensis	CR	Mucubaji Stubfoot Toad							X
Atelopus muisca	CR							X	
Atelopus nahumae	EN							X	
Atelopus nanay	CR						X		
Atelopus nepiozomus	EN	Gualecenita Stubfoot Toad					X		
Atelopus nocturnus	CR	Nocturnal Harlequin Toad						X	
Atelopus oxapampae	EN					X			
Atelopus oxyrhynchus	CR	Rednose Stubfoot Toad							X
Atelopus palmatus	CR						X		
Atelopus pedimarmoratus	CR	San Isidro Stubfoot Toad						X	
Atelopus petersi	CR						X		
Atelopus pinangoi	CR	Pinango Stubfoot Toad							X
Atelopus podocarpus	CR						X		
Atelopus pulcher	VU	Arlequin Camuflado Peruano				X			
Atelopus pyrodactylus	CR					X			
Atelopus sanjosei	CR	Anori Stubfoot Toad						X	
Atelopus seminiferus	EN	Upper Amazon Stubfoot Toad				X			
Atelopus simulatus	CR							X	
Atelopus sorianoi	CR	Cloud Forest Stubfoot Toad							X
Atelopus spumarius	VU	Pebas Stubfoot Toad				X	X	X	
Atelopus tamaense	CR	Tama's Harlequin Toad Venezuela Stubfoot Toad						X	X
Atelopus tricolor	VU	Bolivian Stubfoot Toad		X		X			
Atopophrynus syntomopus	CR	Sonson Frog						X	
Boana gladiator	VU					X			
Boana palaestes	EN					X			
Bolitoglossa capitana	CR	Orphan Salamander						X	
Bolitoglossa chica	VU	Hotel Zaracay Salamander					X		
Bolitoglossa guaneae	VU							X	
Bolitoglossa guaramacalensis	VU								X
Bolitoglossa hiemalis	VU	Salamandro de Páramo						X	

Scientific name	Global threat IUCN	English name (if available)	Argentina	Bolivia	Chile	Peru	Ecuador	Colombia	Venezuela
Bolitoglossa hypacra	EN	Paramo Frontino Salamander						X	
Bolitoglossa medemi	VU	Finca Chibigui Salamander						X	
Bolitoglossa orestes	VU	Culata Mushroomtongue Salamander							X
Bolitoglossa pandi	EN	Pandi Mushroomtongue Salamander						X	
Bolitoglossa tatamae	EN							X	
Bolitoglossa yariguiensis	EN	Yariguies Salamander						X	
Bryophryne cophites	EN	Cuzco Andes Frog				X			
Callimedusa ecuatoriana	VU	Agua Rica Leaf Frog				X	X		
Callimedusa perinesos	EN	Orange-spotted Leaf Frog					X	X	
Celsiella revocata	VU	El Tovar Glass Frog							X
Centrolene ballux	EN	Burrowes' Giant Glass Frog					X	X	
Centrolene buckleyi	VU	Buckley's Giant Glass Frog				X	X	X	X
Centrolene daidalea	VU	Alban Cochran Frog						X	
Centrolene gemmatum	CR						X		
Centrolene heloderma	VU	Pichincha Giant Glass Frog					X	X	
Centrolene hesperium	EN	Basecamp Giant Glass Frog				X			
Centrolene huilense	EN	Huila Glass Frog					X	X	
Centrolene lynchi	EN	Lynch's Giant Glass Frog					X		
Centrolene medemi	EN						X	X	
Centrolene petrophilum	EN	Boyaca Giant Glass Frog						X	
Centrolene pipilata	CR	Amazon Giant Glass Frog					X		
Centrolene quindianum	VU							X	
Centrolene sabini	VU	Sabin's Glass Frog				X			
Centrolene scirtetes	EN	Tandayapa Giant Glass Frog					X	X	
Centrolene solitaria	EN	Lonely Cochran Frog						X	
Ceratophrys stolzmanni	VU	Pacific Horned Frog				X	X		
Cochranella euhystrix	CR	Ridge Cochran Frog				X			
Cochranella litoralis	VU						X	X	
Cochranella megistra	EN	Urrao Cochran Frog						X	
Cochranella xanthocheridia	VU							X	
Colostethus agilis	EN	Cauca Rocket Frog						X	
Colostethus jacobuspetersi	CR						X		
Colostethus mertensi	VU	Mertens' Rocket Frog						X	
Colostethus thorntoni	VU	Thornton's Rocket Frog						X	
Colostethus ucumari	EN							X	
Cryptobatrachus boulengeri	VU	Boulenger's Backpack Frog						X	
Cryptobatrachus pedroruizi	EN							X	X
Cryptobatrachus ruthveni	EN							X	
Ctenophryne barbatula	EN					X			
Ctenophryne carpish	EN					X			
Dendropsophus meridensis	EN	Merida Treefrog							X
Diasporus anthrax	VU							X	
Ectopoglossus confusus	EN	Confusing Rocket Frog					X		
Epicrionops columbianus	EN	El Tambo Caecilian						X	
Epicrionops parkeri	VU	Parker's Caecilian						X	
Epipedobates tricolor	VU	Phantasmal Poison Frog					X		
Excidobates captivus	VU	Santiago River Poison Frog				X	X		

Scientific name	Global threat IUCN	English name (if available)	Argentina	Bolivia	Chile	Peru	Ecuador	Colombia	Venezuela
Excidobates condor	EN	Condor Poison Frog				X	X		
Excidobates mysteriosus	EN	Marañon Poison Frog				X			
Flectonotus fitzgeraldi	EN	Fitzgerald's Marsupial Frog							X
Gastrotheca atympana	VU					X			
Gastrotheca aureomaculata	EN	Gold-spotted Marsupial Frog						X	
Gastrotheca bufona	VU	Antioquia Marsupial Frog						X	
Gastrotheca christiani	CR	Calilegua's Marsupial Frog	X						
Gastrotheca chrysosticta	EN	Baritu's Marsupial Frog	X						
Gastrotheca cornuta	EN	Horned Marsupial Frog					X	X	
Gastrotheca dendronastes	EN	Calima River Marsupial Frog					X	X	
Gastrotheca espeletia	EN	North Shore Marsupial Frog					X	X	
Gastrotheca excubitor	VU	Abra Acanacu Marsupial Frog				X			
Gastrotheca gracilis	EN	La Banderita Marsupial Frog	X						
Gastrotheca lateonota	VU	El Tambo Marsupial Frog				X	X		
Gastrotheca lauzuricae	CR	La Siberia Marsupial Frog		X					
Gastrotheca litonedis	EN						X		
Gastrotheca lojana	VU						X		
Gastrotheca nebulanastes	EN					X			
Gastrotheca ochoai	EN	Chilca Marsupial Frog				X			
Gastrotheca oresbios	EN					X			
Gastrotheca orophylax	VU	Papallacta Marsupial Frog					X	X	
Gastrotheca ovifera	EN	Common marsupial frog							X
Gastrotheca pacchamama	EN	Ayacucho Marsupial Frog				X			
Gastrotheca pachachacae	VU					X			
Gastrotheca phelloderma	VU					X			
Gastrotheca plumbea	VU						X		
Gastrotheca psychrophila	EN						X		
Gastrotheca rebeccae	EN					X			
Gastrotheca riobambae	EN	Riobamba Marsupial Frog					X		
Gastrotheca splendens	EN	Schmidt's Marsupial Frog		X					
Gastrotheca stictopleura	EN					X			
Gastrotheca trachyceps	EN	Cerro Munchique Marsupial Frog						X	
Geobatrachus walkeri	EN	Walker's Sierra Frog						X	
Hemiphractus johnsoni	EN	Johnson's Horned Treefrogs						X	
Hyalinobatrachium anachoretus	EN					X			
Hyalinobatrachium esmeralda	EN							X	
Hyalinobatrachium fragile	VU	Fragile Glass Frog							X
Hyalinobatrachium guairarepanense	EN	El Avila Glass Frog							X
Hyalinobatrachium ibama	VU							X	
Hyalinobatrachium orientale	VU	Eastern Glass Frog							X

Scientific name	Global threat IUCN	English name (if available)	Argentina	Bolivia	Chile	Peru	Ecuador	Colombia	Venezuela
Hyalinobatrachium pallidum	EN	Guacharaquita Glass Frog							X
Hyloscirtus antioquia	VU							X	
Hyloscirtus callipeza	VU	Sardinata Treefrog						X	
Hyloscirtus caucanus	EN	Cauca Treefrog						X	
Hyloscirtus charazani	EN			X					
Hyloscirtus chlorosteus	CR	Parjacti Treefrog		X					
Hyloscirtus criptico	EN	Cryptic Torrenteer					X		
Hyloscirtus denticulentus	VU	Charta Treefrog						X	
Hyloscirtus diabolus	VU					X			
Hyloscirtus japreria	EN	Perija's Stream Frog						X	X
Hyloscirtus lynchi	CR	Lynch's Colombian Treefrog						X	
Hyloscirtus pantostictus	CR	Chingual River Valley Treefrog					X	X	
Hyloscirtus piceigularis	EN	Luisito River Treefrog						X	
Hyloscirtus platydactylus	VU	Merida Andes Treefrog						X	X
Hyloscirtus psarolaimus	VU	Papallacta Treefrog					X	X	
Hyloscirtus ptychodactylus	EN						X		
Hyloscirtus sarampiona	EN	Western Andes Treefrog						X	
Hyloscirtus simmonsi	VU	Simmons' Treefrog						X	
Hyloscirtus staufferorum	EN						X		
Hyloscirtus tigrinus	EN						X	X	
Hyloscirtus torrenticola	VU	El Pepino Treefrog					X	X	
Hyloxalus anthracinus	CR	South American Rocket Frog					X		
Hyloxalus azureiventris	EN	Sky Blue Poison Dart Frog				X			
Hyloxalus cevallosi	EN					X	X		
Hyloxalus chocoensis	EN	Choco Rocket Frog						X	
Hyloxalus delatorreae	CR						X		
Hyloxalus fascianigrus	VU	Rana Saltarina de Brazalete						X	
Hyloxalus insulatus	VU					X			
Hyloxalus pinguis	EN	Malvasa Rocket Frog						X	
Hyloxalus ramosi	EN	Ramos' Rocket Frog						X	
Hyloxalus ruizi	CR	Ruiz's Rocket Frog						X	
Hyloxalus sylvaticus	EN	Forest Rocket Frog				X			
Hyloxalus toachi	EN						X		
Hyloxalus vergeli	VU	Hellmich's Rocket Frog						X	
Hyloxalus vertebralis	CR	Boulenger's Rocket Frog					X		
Ikakogi tayrona	VU	Magdalena Giant Glass Frog						X	
Leptodactylus peritoaktites	VU	Coastal Ecuador Smoky Jungle Frog					X		
Leucostethus ramirezi	EN							X	
Lynchius nebulanastes	EN	Canchaque Andes Frog				X			
Lynchius parkeri	EN	Parker's Andes Frog				X			
Lynchius simmonsi	VU	Simmons' Big-headed Frog				X	X		
Mannophryne collaris	EN	Merida's collared frog							X
Mannophryne cordilleriana	CR	Andean collared frog							X
Mannophryne leonardoi	EN								X
Mannophryne neblina	CR	Aragua Poison Frog							X
Mannophryne riveroi	EN	Rivero's collared frog							X

Scientific name	Global threat IUCN	English name (if available)	Argentina	Bolivia	Chile	Peru	Ecuador	Colombia	Venezuela
Mannophryne trujillensis	EN								X
Mannophryne yustizi	EN	Yacambú Collared Frog							X
Microkayla adenopleura	VU			X					
Microkayla ankohuma	VU			X					
Microkayla boettgeri	CR					X			
Microkayla chacaltaya	VU			X					
Microkayla guillei	CR			X					
Microkayla illampu	VU			X					
Microkayla illimani	CR			X					
Microkayla kallawaya	CR			X					
Microkayla kempffi	VU			X					
Microkayla pinguis	VU			X					
Microkayla quimsacruzis	VU			X					
Microkayla saltator	CR			X					
Microkayla wettsteini	VU	Wettstein's Andes Frog		X					
Nannophryne corynetes	EN	Abra Malaga Toad				X			
Niceforonia adenobrachia	EN							X	
Niceforonia araiodactyla	EN					X			
Niceforonia brunnea	EN	Carchi Andes Frog					X	X	
Niceforonia dolops	VU	Putumayo Robber Frog					X	X	
Niceforonia latens	VU	Boqueron Robber Frog						X	
Niceforonia lucida	EN	Cannatella's Andes Frog				X			
Niceforonia nana	VU	Santander Andes Frog						X	
Noblella lynchi	EN					X			
Noblella madreselva	CR					X			
Noblella personina	EN					X	X		
Nymphargus anomalus	CR	Napo Cochran Frog					X		
Nymphargus armatus	CR							X	
Nymphargus balionota	VU	Mindo Cochran Frog					X	X	
Nymphargus caucanus	EN							X	
Nymphargus cochranae	VU	Cochran Frog					X		
Nymphargus cristinae	EN							X	
Nymphargus garciae	VU							X	
Nymphargus luminosus	EN							X	
Nymphargus luteopunctatus	EN							X	
Nymphargus megacheirus	EN	Santa Rosa Cochran Frog					X	X	
Nymphargus mixomaculatus	CR					X			
Nymphargus phenax	EN	Tutumbaro Cochran Frog				X			
Nymphargus prasinus	VU	Calima River Cochran Frog						X	
Nymphargus rosada	VU							X	
Nymphargus ruizi	VU	Ruiz's Cochran Frog						X	
Nymphargus siren	VU	Coca River Cochran Frog				X	X	X	
Oophaga anchicayensis	EN							X	
Oophaga andresi	EN							X	
Oreobates amarakaeri	VU					X			
Oreobates ayacucho	EN					X			
Oreobates berdemenos	VU		X						
Oreobates lehri	EN					X			
Oreobates lundbergi	EN					X			
Oreobates pereger	EN	Ayacucho Andes Frog				X			
Oreobates zongoensis	CR			X					

Scientific name	Global threat IUCN	English name (if available)	Argentina	Bolivia	Chile	Peru	Ecuador	Colombia	Venezuela
Osornophryne antisana	EN						X		
Osornophryne guacamayo	EN	Guacamayo Plump Toad					X	X	
Osornophryne percrassa	VU	Herveo Plump Toad						X	
Osornophryne puruanta	EN						X		
Osornophryne sumacoensis	VU	Cannatella's Plump Toad					X		
Osornophryne talipes	VU						X	X	
Phrynopus barthlenae	EN					X			
Phrynopus daemon	EN					X			
Phrynopus dagmarae	EN					X			
Phrynopus heimorum	CR					X			
Phrynopus horstpauli	EN					X			
Phrynopus inti	EN	Inti Andes Frog				X			
Phrynopus juninensis	CR	Junin Andes Frog				X			
Phrynopus kauneorum	EN					X			
Phrynopus montium	EN	Cascas Andes Frog				X			
Phrynopus peruanus	CR	Peters' Andes Frog				X			
Phrynopus vestigiatus	EN					X			
Phyllobates bicolor	EN	Black-legged Poison Dart Frog						X	
Pristimantis acerus	EN						X		
Pristimantis actinolaimus	EN							X	
Pristimantis actites	VU						X		
Pristimantis acutirostris	EN	Sharpsnout Robber Frog						X	
Pristimantis aemulatus	EN							X	
Pristimantis affinis	EN	Cundinamarca Robber Frog						X	
Pristimantis alalocophus	EN	Quindio Robber Frog						X	
Pristimantis albertus	VU					X			
Pristimantis angustilineatus	EN							X	
Pristimantis apiculatus	EN	La Planada Robber Frog					X	X	
Pristimantis ardalonychus	EN	Cerranayacu River Rain Frog				X			
Pristimantis atratus	EN						X		
Pristimantis aurantiguttatus	EN							X	
Pristimantis bacchus	EN	Wine Robber Frog						X	
Pristimantis balionotus	EN						X		
Pristimantis baryecuus	EN						X		
Pristimantis batrachites	EN							X	
Pristimantis bellona	EN	Murri Robber Frog						X	
Pristimantis bicolor	VU	Two-colored Robber Frog						X	
Pristimantis bicumulus	VU								X
Pristimantis boconoensis	VU	Bocono Robber Frog							X
Pristimantis bounides	EN	Hill Dweller Rubber Frog				X			
Pristimantis briceni	VU								X
Pristimantis cacao	CR	Cacao Robber Frog						X	
Pristimantis calcaratus	VU	San Antonio Robber Frog						X	
Pristimantis calcarulatus	VU						X	X	
Pristimantis capitonis	EN							X	
Pristimantis caprifer	CR	La Palma Robber Frog						X	
Pristimantis carlossanchezi	EN							X	

Scientific name	Global threat IUCN	English name (if available)	Argentina	Bolivia	Chile	Peru	Ecuador	Colombia	Venezuela
Pristimantis carmelitae	EN	Carmelita's Robber Frog						X	
Pristimantis carranguerorum	EN							X	
Pristimantis celator	VU	La Delicia Robber Frog					X	X	
Pristimantis ceuthospilus	VU	Wild's Robber Frog				X			
Pristimantis chrysops	CR							X	
Pristimantis colomai	VU						X	X	
Pristimantis colonensis	VU						X	X	
Pristimantis colostichos	VU								X
Pristimantis cordovae	EN					X			
Pristimantis corniger	EN							X	
Pristimantis cosnipatae	CR	Cosnipata River Robber Frog				X			
Pristimantis cremnobates	EN						X		
Pristimantis crenunguis	EN						X		
Pristimantis cristinae	EN	Cristina's Robber Frog						X	
Pristimantis crucifer	VU						X		
Pristimantis cryophilius	EN						X		
Pristimantis cuentasi	EN							X	X
Pristimantis degener	EN	Orange Robber Frog					X	X	
Pristimantis deinops	CR							X	
Pristimantis delicatus	EN	Delicate Robber Frog						X	
Pristimantis devillei	EN						X		
Pristimantis diaphonus	CR	Calima River Robber Frog						X	
Pristimantis diogenes	CR							X	
Pristimantis dissimulatus	EN						X		
Pristimantis dorado	EN							X	
Pristimantis dorsopictus	VU	Serna's Robber Frog						X	
Pristimantis duellmani	VU	Duellman's Robber Frog					X	X	
Pristimantis duende	VU							X	
Pristimantis elegans	VU	Elegant Robber Frog						X	
Pristimantis eremitus	VU						X	X	
Pristimantis eriphus	VU	Moss Robber Frog					X	X	
Pristimantis ernesti	VU						X		
Pristimantis eugeniae	EN						X		
Pristimantis fallax	VU							X	
Pristimantis fasciatus	EN	Pejia's striped rain frog							X
Pristimantis festae	EN						X		
Pristimantis floridus	VU						X		
Pristimantis gentryi	EN						X		
Pristimantis ginesi	EN	Rangel Robber Frog							X
Pristimantis gladiator	VU						X	X	
Pristimantis glandulosus	EN						X		
Pristimantis gracilis	VU	Pichinde Robber Frog						X	
Pristimantis grandiceps	EN	Giant Robber Frog						X	
Pristimantis hamiotae	CR						X		
Pristimantis hectus	VU	Dwarf Robber Frog					X	X	
Pristimantis helvolus	EN							X	
Pristimantis hernandezi	EN	Hernandez's Robber Frog						X	
Pristimantis hybotragus	EN	Agua Bonita Robber Frog						X	
Pristimantis ignicolor	EN						X		
Pristimantis incanus	EN						X		
Pristimantis inusitatus	VU						X		

Scientific name	Global threat IUCN	English name (if available)	Argentina	Bolivia	Chile	Peru	Ecuador	Colombia	Venezuela
Pristimantis jaimei	CR	Jaime's Robber Frog						X	
Pristimantis johannesdei	VU							X	
Pristimantis jorgevelosai	EN							X	
Pristimantis juanchoi	VU	Juancho Elf Frog						X	
Pristimantis kelephus	CR							X	
Pristimantis lancinii	EN	Lancini's Robber Frog							X
Pristimantis lasalleorum	EN							X	
Pristimantis laticlavius	VU	Burrowes' Robber Frog					X	X	
Pristimantis lemur	VU							X	
Pristimantis leopardus	VU							X	
Pristimantis leucopus	EN						X	X	
Pristimantis lichenoides	CR	Camouflaged Frog						X	
Pristimantis lividus	EN						X		
Pristimantis loustes	EN	Maldonado Robber Frog					X	X	
Pristimantis lutitus	EN	Luisito River Robber Frog						X	
Pristimantis maculosus	VU	Spotted Robber Frog						X	
Pristimantis mars	CR							X	
Pristimantis merostictus	VU	Bogotacito Robber Frog						X	
Pristimantis metabates	EN					X	X		
Pristimantis mnionaetes	EN							X	
Pristimantis modipeplus	EN						X		
Pristimantis molybrignus	CR	Uribe Robber Frog						X	
Pristimantis muricatus	VU						X		
Pristimantis mutabilis	EN	Mutable Rainfrog					X		
Pristimantis myops	EN							X	
Pristimantis nigrogriseus	VU						X		
Pristimantis nyctophylax	VU						X		
Pristimantis ocellatus	EN						X	X	
Pristimantis ocreatus	EN						X		
Pristimantis orestes	EN						X		
Pristimantis ornatissimus	VU						X		
Pristimantis ornatus	EN					X			
Pristimantis paramerus	EN								X
Pristimantis pardalinus	EN					X			
Pristimantis parectatus	EN							X	
Pristimantis pastazensis	EN						X		
Pristimantis percultus	EN						X		
Pristimantis petrobardus	EN	Huambos Robber Frog				X			
Pristimantis phalarus	EN							X	
Pristimantis pinguis	EN					X			
Pristimantis platychilus	VU							X	
Pristimantis polemistes	CR							X	
Pristimantis polychrus	VU							X	
Pristimantis prolatus	EN						X		
Pristimantis proserpens	VU	Sapote Robber Frog				X	X		
Pristimantis pteridophilus	EN						X		
Pristimantis ptochus	EN							X	

Scientific name	Global threat IUCN	English name (if available)	Argentina	Bolivia	Chile	Peru	Ecuador	Colombia	Venezuela
Pristimantis pugnax	CR	Cutín del Salto de Agua					X	X	
Pristimantis pulchridormientes	EN	Sleeping Beauty Rain Frog				X			
Pristimantis pycnodermis	EN						X		
Pristimantis pyrrhomerus	EN						X		
Pristimantis quantus	EN							X	
Pristimantis quinquagesimus	VU	Zapadores Robber Frog					X	X	
Pristimantis racemus	VU	Las Hermosas Robber Frog						X	
Pristimantis reclusas	CR							X	X
Pristimantis renjiforum	EN							X	
Pristimantis repens	EN	Galeras Robber Frog						X	
Pristimantis rhodoplichus	EN	Canchaque Robber Frog				X	X		
Pristimantis rivasi	VU							X	X
Pristimantis rosadoi	VU	Rosado's Robber Frog					X	X	
Pristimantis rubicundus	EN						X		
Pristimantis ruedai	VU							X	
Pristimantis rufioculis	VU					X	X		
Pristimantis ruthveni	EN	Ruthven's Robber Frog						X	
Pristimantis satagius	EN							X	
Pristimantis schultei	VU	Schulte's Robber Frog				X			
Pristimantis scoloblepharus	EN	Los Patos Robber Frog						X	
Pristimantis scolodiscus	VU	Ricuarte Robber Frog					X	X	
Pristimantis serendipitus	EN					X			
Pristimantis signifer	CR							X	
Pristimantis silverstonei	VU							X	
Pristimantis simonbolivari	EN						X		
Pristimantis simonsii	VU	Andes Paramo Frog				X			
Pristimantis simoteriscus	EN							X	
Pristimantis siopelus	VU	Reserve Robber Frog						X	
Pristimantis sobetes	EN						X		
Pristimantis spilogaster	CR	Gambita Robber Frog						X	
Pristimantis suetus	VU							X	
Pristimantis sulculus	VU	Channel Robber Frog						X	
Pristimantis supernatis	VU	El Carmelo Robber Frog					X	X	
Pristimantis surdus	EN						X		
Pristimantis susaguae	EN							X	
Pristimantis tamsitti	VU	San Adolfo Robber Frog						X	
Pristimantis tenebrionis	EN						X		
Pristimantis thymalopsoides	EN						X		
Pristimantis torrenticola	CR							X	
Pristimantis tribulosus	CR							X	
Pristimantis truebae	EN						X		
Pristimantis turumiquirensis	EN								X
Pristimantis uisae	VU							X	
Pristimantis veletis	CR							X	
Pristimantis vertebralis	VU						X		
Pristimantis vidua	EN						X		
Pristimantis viridicans	EN	Cerro Munchique Robber Frog						X	

Scientific name	Global threat IUCN	English name (if available)	Argentina	Bolivia	Chile	Peru	Ecuador	Colombia	Venezuela
Pristimantis viridis	EN							X	
Pristimantis wagteri	EN					X			
Pristimantis xeniolum	VU							X	
Pristimantis xestus	VU							X	
Pristimantis xylochobates	CR							X	
Pristimantis zoilae	EN							X	
Psychrophrynella bagrecito	CR	Bagrecito Andes Frog				X			
Ranitomeya fantastica	VU	Fantastic Poison Frog				X			
Ranitomeya summersi	EN	Summers' Poison Frog				X			
Rhaebo andinophrynoides	VU						X	X	
Rhaebo atelopoides	CR	Western Andes Toad						X	
Rhaebo caeruleostictus	EN	Blue-spotted Toad					X		
Rhaebo colomai	EN	Carchi Andes Toad					X	X	
Rhaebo olallai	CR	Tandayapa Andes Toad					X		
Rhinella amabilis	CR						X		
Rhinella arborescandens	EN					X			
Rhinella chavin	EN					X			
Rhinella cristinae	EN							X	
Rhinella gallardoi	EN		X						
Rhinella justinianoi	VU			X					
Rhinella lindae	EN	Murri Beaked Toad						X	
Rhinella macrorhina	VU	Santa Rita Beaked Toad						X	
Rhinella nicefori	EN	Colombian Beaked Toad						X	
Rhinella quechua	VU			X					
Rhinella ruizi	VU							X	
Rhinella rumbolli	VU	Salta Toad	X						
Rhinella tenrec	EN	Antioquia Beaked Toad						X	
Rhinella vellardi	EN	Alto Marañon Toad				X			
Rhinella yanachaga	EN					X			
Rhinella yunga	EN					X			
Rulyrana adiazeta	VU	Western Cochran Frog						X	
Rulyrana saxiscandens	EN	Tarapoto Cochran Frog				X			
Sachatamia electrops	EN							X	
Sachatamia punctulata	VU							X	
Silverstoneia erasmios	EN							X	
Strabomantis anatipes	VU	Anatipes Robber Frog					X	X	
Strabomantis biporcatus	VU								X
Strabomantis cadenai	CR	Nutibara Robber Frog						X	
Strabomantis cheiroplethus	EN	Calles River Robber Frog						X	
Strabomantis cornutus	VU	Suno River Robber Frog					X	X	
Strabomantis helonotus	CR						X		
Strabomantis ingeri	VU	Inger's Robber Frog						X	
Strabomantis necopinus	VU							X	
Strabomantis ruizi	EN							X	
Tachiramantis douglasi	VU							X	
Tachiramantis lassoalcalai	VU	Lasso-Alcala's Rain Frog							X
Telmatobius atacamensis	CR	Atacama Water Frog	X						
Telmatobius atahualpai	VU	Amazonas Water Frog				X			
Telmatobius brachydactylus	EN	Junin Riparian Frog				X			

Scientific name	Global threat IUCN	English name (if available)	Argentina	Bolivia	Chile	Peru	Ecuador	Colombia	Venezuela
Telmatobius brevipes	VU	Huahachuco Water Frog				X			
Telmatobius brevirostris	EN	Shortsnout Water Frog				X			
Telmatobius carrillae	VU	Ancash Water Frog				X			
Telmatobius chusmisensis	EN				X				
Telmatobius cirrhacelis	CR	Loja Water Frog					X		
Telmatobius culeus	EN	Titicaca Water Frog		X		X			
Telmatobius edaphonastes	EN			X					
Telmatobius espadai	CR			X					
Telmatobius fronteriensis	CR			X	X				
Telmatobius gigas	CR			X					
Telmatobius hauthali	EN		X						
Telmatobius hintoni	VU			X					
Telmatobius huayra	VU			X					
Telmatobius hypselocephalus	EN		X						
Telmatobius ignavus	EN	Piura Water Frog				X			
Telmatobius intermedius	EN	Allipaca Water Frog				X			
Telmatobius latirostris	EN	Cajamarca Water Frog				X			
Telmatobius macrostomus	EN	Lake Junin Frog				X			
Telmatobius marmoratus	VU	Marbled Water Frog		X	X	X			
Telmatobius mayoloi	EN					X			
Telmatobius niger	CR	Black Water Frog					X		
Telmatobius oxycephalus	EN		X						
Telmatobius pefauri	CR	Arico Water Frog			X				
Telmatobius peruvianus	VU	Peru Water Frog		X	X	X			
Telmatobius philippii	CR				X				
Telmatobius pinguiculus	EN		X						
Telmatobius pisanoi	EN		X						
Telmatobius platycephalus	EN		X						
Telmatobius punctatus	EN	Huanaco Water Frog				X			
Telmatobius rimac	VU	Rimac Water Frog				X			
Telmatobius rubigo	VU	Laguna de los Pozuelos' Rusted Frog	X	X					
Telmatobius sanborni	VU	Sanborn's Water Frog		X		X			
Telmatobius scrocchii	CR	Andalgala Water Frog	X						
Telmatobius sibiricus	EN			X					
Telmatobius stephani	EN		X						
Telmatobius timens	CR	Tojologue Water Frog		X		X			
Telmatobius truebae	VU	Trueb's Water Frog				X			
Telmatobius vellardi	CR	Vellard's Water Frog					X		
Telmatobius ventriflavum	CR	Andean Water Frog				X			
Telmatobius verrucosus	VU			X					
Telmatobius vilamensis	CR				X				
Telmatobius yuracare	VU			X					
Telmatobius zapahuirensis	EN	Zapahuira Water Frog			X				
Truebella tothastes	EN					X			
Vitreorana antisthenesi	VU	Aragua Glass Frog							X

Scientific name	Global threat IUCN	English name (if available)	Argentina	Bolivia	Chile	Peru	Ecuador	Colombia	Venezuela
Yunganastes ashkapara	VU			X					
Yunganastes bisignatus	EN			X					

Table 5.1.2. Arthropods (Insects and crustaceans)

Scientific name	Global threat IUCN	English name (if available)	Argentina	Bolivia	Chile	Peru	Ecuador	Colombia	Venezuela
Acanthagrion williamsoni	EN							X	
Agriogomphus jessei	EN							X	X
Ateuchus ambiguus	EN								X
Bromeliagrion fernandezianum	VU						X		X
Canthonella gomezi	EN								X
Chibchacris sturmi	VU	El Cocuy Mountain Grasshopper						X	
Cryptocanthon altus	EN							X	
Cryptocanthon nebulinus	EN								X
Cryptocanthon punctatus	EN								X
Drepanoneura donnellyi	EN							X	
Dysonia alipes	VU	Central Cordillera Lichen Katydid						X	
Gomphomachromia nodisticta	EN		X						
Heteragrion calendulum	EN							X	
Heteragrion peregrinum	CR							X	
Heteropodagrion nigripes	VU						X		
Heteropodagrion varipes	EN						X		
Hypolobocera barbacensis	VU							X	
Jivarus ochraceus	EN	Inga Grasshopper						X	
Leptobasis buchholzi	EN							X	X
Mesamphiagrion demarmelsi	EN							X	
Mesamphiagrion gaudiimontanum	EN							X	
Mesamphiagrion nataliae	EN							X	
Mesamphiagrion ovigerum	VU							X	
Mesamphiagrion rosseri	VU							X	
Mesamphiagrion santainense	EN							X	
Mesamphiagrion tamaense	VU							X	X
Metalloeptobasis gibbosa	CR						X		

Scientific name	Global threat IUCN	English name (if available)	Argentina	Bolivia	Chile	Peru	Ecuador	Colombia	Venezuela
Miocora lugubris	VU							X	
Oligoclada heliophila	VU							X	X
Ontherus hadros	VU						X		
Palaemnema croceicauda	CR							X	
Palaemnema edmondi	CR							X	
Palaemnema orientalis	EN								X
Parides phalaecus	VU					X	X		
Perissolestes remus	CR						X		
Peruphasma schultei	CR	Golden-Eyed Stick Insect				X			
Crystalline phylogeny	VU							X	
Philogenia monotis	EN						X		
Rhionaeschna caligo	EN							X	
Rhionaeschna haarupi	VU		X						
Sciotropis lattkei	EN	Paria Wood Elf							X
Scybalocanthon arcabuquensis	EN							X	
Sympetrum evanescens	CR								X
Teinopodagrion temporale	VU							X	
Telebasis farcimentum	VU							X	
Telebasis flammeola	EN						X		
Telebasis garrisoni	VU							X	X

Table 5.1.3. Birds

Scientific name	Global threat IUCN	English name (if available)	Argentina	Bolivia	Chile	Peru	Ecuador	Colombia	Venezuela
Agamia agami	VU	Agami Heron		X		X	X	X	X
Aglaeactis aliciae	EN	Purple-backed Sunbeam				X			
Aglaiocercus berlepschi	EN	Venezuelan Sylph							X
Agriornis albicauda	VU	White-tailed Shrike-tyrant	X	X	X	X	X		
Alectrurus tricolor	VU	Cock-tailed Tyrant		X					
Amazona barbadensis	VU	Yellow-shouldered Amazon							X
Amazona lilacina	EN	Lilacine Amazon					X		
Amazona tucumana	VU	Tucuman Amazon	X	X					
Ampelornis griseiceps	VU	Grey-headed Antbird				X	X		
Anairetes alpinus	EN	Ash-breasted Tit-tyrant		X		X			
Anthocephala berlepschi	VU	Tolima Blossomcrown						X	
Anthocephala floriceps	VU	Santa Marta Blossomcrown						X	
Ara ambiguus	EN	Great Green Macaw					X	X	
Ara militaris	VU	Military Macaw	X	X		X	X	X	X
Ara rubrogenys	CR	Red-fronted Macaw		X					
Aramides wolfi	VU	Brown Wood-rail				X	X	X	
Arremon perijanus	VU	Perija Brush-finch						X	X
Arremon phygas	VU	Paria Brush-finch							X
Asthenes helleri	VU	Puna Thistletail		X		X			
Asthenes perijana	EN	Perija Thistletail						X	X
Asthenes usheri	VU	White-tailed Canastero				X			
Atlapetes blancae	CR	Antioquia Brush-Finch						X	
Atlapetes flaviceps	EN	Olive-headed Brush-Finch						X	

Scientific name	Global threat IUCN	English name (if available)	Argentina	Bolivia	Chile	Peru	Ecuador	Colombia	Venezuela
Atlapetes melanopsis	EN	Black-spectacled Brush Finch				X			
Atlapetes pallidiceps	EN	Pale-headed Brush Finch					X		
Attila torridus	VU	Ochraceous Attila				X	X	X	
Aulacorhynchus huallagae	EN	Yellow-browed Toucanet				X			
Bangsia aureocincta	EN	Gold-ringed Tanager						X	
Bangsia flavovirens	VU	Yellow-green Tanager					X	X	
Bangsia melanochlamys	VU	Black-and-gold Tanager						X	
Basileuterus griseiceps	EN	Grey-headed Warbler							X
Bolborhynchus ferrugineifrons	VU	Rufous-fronted Parakeet						X	
Brotogeris pyrrhoptera	EN	Grey-cheeked Parakeet				X	X		
Buteogallus coronatus	EN	Crowned Solitary Eagle	X	X					
Cacicus koepckeae	EN	Selva Cacique				X			
Campylopterus phainopeplus	EN	Santa Marta Sabrewing						X	
Capito hypoleucus	VU	White-mantled Barbet						X	
Cephalopterus penduliger	VU	Long-wattled Umbrellabird					X	X	
Chaetocercus bombus	VU	Little Woodstar				X	X	X	
Chaetura pelagica	VU	Chimney Swift		X	X	X	X	X	X
Chloropipo flavicapilla	VU	Yellow-headed Manakin					X	X	
Cinclodes aricomae	CR	Royal Cinclodes		X		X			
Cinclodes palliatus	CR	White-bellied Cinclodes				X			
Cinclus schulzii	VU	Rufous-throated Dipper	X	X					
Cistothorus apolinari	EN	Apolinar's Wren						X	
Clibanornis erythrocephalus	VU	Henna-hooded Foliage-gleaner				X	X		
Clytoctantes alixii	EN	Recurve-billed Bushbird						X	X
Cnemathraupis aureodorsalis	EN	Golden-backed Mountain-tanager				X			
Cnipodectes superrufus	VU	Rufous Twistwing		X		X			
Coeligena consita	VU	Perija Starfrontlet						X	X
Coeligena orina	CR	Glittering Starfrontlet						X	
Coeligena prunellei	VU	Black Inca						X	
Conirostrum tamarugense	VU	Tamarugo Conebill			X	X			
Conopias cinchoneti	VU	Lemon-browed Flycatcher				X	X	X	X
Coryphaspiza melanotis	VU	Black-masked Finch	X	X		X			
Cranioleuca berlepschi	VU	Russet-mantled Softtail				X			
Cranioleuca curtata	VU	Ash-browed Spinetail		X		X	X	X	
Cranioleuca henricae	VU	Bolivian Spinetail		X					
Cranioleuca marcapatae	VU	Marcapata Spinetail				X			
Crax alberti	CR	Blue-billed Curassow						X	
Crax alector	VU	Black Curassow						X	X
Crax fasciolata	VU	Bare-faced Curassow	X	X					
Crax rubra	VU	Great Curassow					X	X	
Cryptoleucopteryx plumbea	VU	Plumbeous Hawk				X	X	X	
Culicivora caudacuta	VU	Sharp-tailed Tyrant	X	X					
Dacnis berlepschi	VU	Scarlet-breasted Dacnis					X	X	
Dacnis hartlaubi	VU	Turquoise Dacnis						X	
Dendrocolaptes punctipectus	VU	Eastern Barred Woodcreeper						X	X
Diglossa venezuelensis	EN	Venezuelan Flowerpiercer							X
Doliornis remseni	VU	Chestnut-bellied Cotinga					X	X	

Scientific name	Global threat IUCN	English name (if available)	Argentina	Bolivia	Chile	Peru	Ecuador	Colombia	Venezuela
Doliornis sclateri	VU	Bay-vented Cotinga				X			
Dubusia carrikeri	EN	Carriker's Mountain-tanager						X	
Dysithamnus leucostictus	VU	White-streaked Antvireo				X	X	X	X
Dysithamnus occidentalis	VU	Bicolored Antvireo				X	X	X	
Eriocnemis isabellae	CR	Gorgeted Puffleg						X	
Eriocnemis mirabilis	EN	Colorful Puffleg						X	
Eriocnemis nigrivestis	CR	Black-breasted Puffleg					X		
Euchrepomis sharpei	EN	Yellow-rumped Antwren		X		X			
Eulidia yarrellii	CR	Chilean Woodstar			X	X			
Forpus xanthops	VU	Yellow-faced Parrotlet				X			
Galbula pastazae	VU	Coppery-chested Jacamar				X	X	X	
Geotrygon purpurata	EN	Purple Quail-dove					X	X	
Glaucidium nubicola	VU	Cloudforest Pygmy-owl					X	X	
Grallaria alleni	VU	Moustached Antpitta					X	X	
Grallaria bangsi	VU	Santa Marta Antpitta						X	
Grallaria chthonia	CR	Tachira Antpitta							X
Grallaria excelsa	VU	Great Antpitta						X	X
Grallaria fenwickorum	CR	Urrao Antpitta						X	
Grallaria gigantea	VU	Giant Antpitta					X	X	
Grallaria kaestneri	EN	Cundinamarca Antpitta						X	
Grallaria milleri	VU	Brown-banded Antpitta						X	
Grallaria przewalskii	VU	Rusty-tinged Antpitta				X			
Grallaria ridgelyi	EN	Jocotoco Antpitta				X	X		
Grallaria rufocinerea	VU	Bicolored Antpitta					X	X	
Grallaria saltuensis	EN	Perija Antpitta						X	X
Grallaricula cucullata	VU	Hooded Antpitta						X	X
Grallaricula cumanensis	VU	Sucre Antpitta							X
Grallaricula ochraceifrons	EN	Ochre-fronted Antpitta				X			
Gubernatrix cristata	EN	Yellow Cardinal	X						
Hapalopsittaca amazonina	VU	Rusty-faced Parrot						X	X
Hapalopsittaca fuertesi	CR	Indigo-winged Parrot						X	
Hapalopsittaca pyrrhops	VU	Red-faced Parrot				X	X		
Heliangelus regalis	EN	Royal Sunangel				X	X		
Heliodoxa gularis	VU	Pink-throated Brilliant				X	X	X	
Henicorhina negreti	VU	Munchique Wood-wren						X	
Herpsilochmus axillaris	VU	Yellow-breasted Antwren				X	X	X	
Herpsilochmus parkeri	EN	Ash-throated Antwren				X			
Hylonympha macrocerca	EN	Scissor-tailed Hummingbird							X
Hypopyrrhus pyrohypogaster	VU	Red-bellied Grackle						X	
Laterallus jamaicensis	EN	Black Rail	X		X	X			
Laterallus levraudi	VU	Rusty-flanked Crake							X
Laterallus tuerosi	EN	Junin Rail				X			
Lathrotriccus griseipectus	VU	Grey-breasted Flycatcher				X	X		
Leptasthenura xenothorax	EN	White-browed Tit-spinetail				X			
Leptosittaca branickii	VU	Golden-plumed Parakeet				X	X	X	
Leptotila conoveri	EN	Tolima Dove						X	
Leptotila ochraceiventris	VU	Ochre-bellied Dove				X	X		
Lipaugus uropygialis	VU	Scimitar-winged Piha		X		X			

Scientific name	Global threat IUCN	English name (if available)	Argentina	Bolivia	Chile	Peru	Ecuador	Colombia	Venezuela
Lipaugus weberi	CR	Chestnut-capped Piha						X	
Loddigesia mirabilis	EN	Marvelous Spatuletail				X			
Macroagelaius subalaris	EN	Mountain Grackle						X	X
Megascops gilesi	VU	Santa Marta Screech-owl						X	
Metallura baroni	EN	Violet-throated Metaltail					X		
Metallura iracunda	EN	Perija Metaltail						X	X
Micrastur plumbeus	VU	Plumbeous Forest-falcon					X	X	
Microspingus alticola	EN	Plain-tailed Warbling-finch				X			
Myiarchus semirufus	VU	Rufous Flycatcher				X	X		
Myioborus pariae	EN	Paria Whitestart							X
Myiotheretes pernix	EN	Santa Marta Bush-tyrant						X	
Myiothlypis basilica	VU	Santa Marta Warbler						X	
Neomorphus geoffroyi	VU	Rufous-vented Ground-cuckoo		X		X	X	X	
Neomorphus radiolosus	EN	Banded Ground Cuckoo					X	X	
Nothocercus nigrocapillus	VU	Hooded Tinamou		X		X			
Nothoprocta taczanowskii	VU	Taczanowski's Tinamou		X		X			
Odontophorus atrifrons	VU	Black-fronted Wood-quail						X	X
Odontophorus melanonotus	VU	Dark-backed Wood-quail					X	X	
Odontophorus strophium	VU	Gorgeted Wood-quail						X	
Ognorhynchus icterotis	EN	Yellow-eared Parrot					X	X	X
Onychorhynchus occidentalis	VU	Pacific Royal Flycatcher				X	X		
Ortalis erythroptera	VU	Rufous-headed Chachalaca				X	X	X	
Oxypogon cyanolaemus	CR	Blue-bearded Helmetcrest						X	
Oxypogon stuebelii	VU	Buffy Helmetcrest						X	
Pachyramphus spodiurus	VU	Slaty Becard				X	X		
Patagioenas oenops	VU	Peruvian Pigeon				X	X		
Patagioenas subvinacea	VU	Ruddy Pigeon		X		X	X	X	X
Pauxi pauxi	EN	Helmeted Curassow						X	X
Pauxi unicornis	CR	Horned Curassow		X					
Penelope albipennis	EN	White-winged Guan				X	X		
Penelope ortoni	EN	Baudo Guan					X	X	
Penelope perspicax	EN	Cauca Guan						X	
Phacellodomus dorsalis	VU	Chestnut-backed Thornbird				X			
Phibalura boliviana	EN	Apolo Cotinga		X					
Phlogophilus hemileucurus	VU	Ecuadorian Piedtail				X	X	X	
Phoenicoparrus andinus	VU	Andean Flamingo	X	X	X	X			
Phyllomyias urichi	EN	Urich's Tyrannulet							X
Phyllomyias weedeni	VU	Yungas Tyrannulet		X		X			
Phytotoma raimondii	VU	Peruvian Plantcutter				X			
Picumnus steindachneri	EN	Speckle-chested Piculet				X			
Podiceps taczanowskii	CR	Junin Grebe				X			
Poecilotriccus luluae	EN	Lulu's Tody-flycatcher				X			
Pogonotriccus lanyoni	EN	Antioquia Bristle-tyrant						X	
Poospiza baeri	VU	Tucuman Mountain-finch	X	X					
Poospiza garleppi	EN	Cochabamba Mountain-finch		X					
Poospiza goeringi	VU	Slaty-backed Hemispingus							X

Scientific name	Global threat IUCN	English name (if available)	Argentina	Bolivia	Chile	Peru	Ecuador	Colombia	Venezuela
Poospiza rubecula	EN	Rufous-breasted Warbling-finch				X			
Premnoplex pariae	EN	Paria Barbtail							X
Premnoplex tatei	EN	White-throated Barbtail							X
Primolius couloni	VU	Blue-headed Macaw		X		X			
Progne murphyi	VU	Peruvian Martin			X	X			
Psarocolius cassini	VU	Baudo Oropendola						X	
Pseudastur occidentalis	EN	Grey-backed Hawk				X	X		
Pyrrhura albipectus	VU	White-necked Parakeet					X		
Pyrrhura caeruleiceps	EN	Perija Parakeet						X	X
Pyrrhura calliptera	VU	Brown-breasted Parakeet						X	X
Pyrrhura chapmani	VU	Upper Magdalena Parakeet						X	
Pyrrhura orcesi	EN	El Oro Parakeet					X		
Pyrrhura viridicata	EN	Santa Marta Parakeet						X	
Rallus semiplumbeus	EN	Bogota Rail						X	
Ramphastos culminatus	VU	Yellow-ridged Toucan		X		X	X	X	X
Ramphastos tucanus	VU	Red-billed Toucan							X
Ramphastos vitellinus	VU	Channel-billed Toucan						X	X
Ramphomicron dorsale	EN	Black-backed Thornbill						X	
Rollandia microptera	EN	Titicaca Grebe		X		X			
Scytalopus canus	EN	Paramillo Tapaculo						X	
Scytalopus perijanus	VU	Perija Tapaculo						X	X
Scytalopus robbinsi	EN	Ecuadorian Tapaculo					X		
Scytalopus rodriguezi	EN	Magdalena Tapaculo						X	
Sericossypha albocristata	VU	White-capped Tanager				X	X	X	X
Spinus cucullatus	EN	Red Siskin						X	X
Spinus siemiradzkii	VU	Saffron Siskin				X	X		
Spizaetus isidori	EN	Black-and-chestnut Eagle	X	X		X	X	X	X
Sporophila maximiliani	EN	Great-billed Seed-finch		X					X
Synallaxis courseni	VU	Apurimac Spinetail				X			
Synallaxis fuscorufa	VU	Rusty-headed Spinetail						X	
Synallaxis hypochondriaca	VU	Great Spinetail				X			
Synallaxis maranonica	CR	Maranon Spinetail				X	X		
Synallaxis tithys	VU	Blackish-headed Spinetail				X	X		
Syndactyla ruficollis	VU	Rufous-necked Foliage-gleaner				X	X		
Tangara argyrofenges	VU	Straw-backed Tanager		X		X	X		
Taphrolesbia griseiventris	EN	Grey-bellied Comet				X			
Tephrophilus wetmorei	VU	Masked Mountain-tanager				X	X	X	
Thamnophilus tenuepunctatus	VU	Lined Antshrike				X	X	X	
Thryophilus nicefori	CR	Niceforo's Wren						X	
Thryophilus sernai	EN	Antioquia Wren						X	
Tinamus osgoodi	VU	Black Tinamou				X	X	X	
Tinamus tao	VU	Grey Tinamou		X		X	X	X	X
Touit huetii	VU	Scarlet-shouldered Parrotlet		X		X	X	X	X
Touit stictopterus	VU	Spot-winged Parrotlet				X	X	X	
Troglodytes monticola	CR	Santa Marta Wren						X	
Wetmorethraupis sterrhopteron	VU	Orange-throated Tanager				X	X		
Xenoglaux loweryi	EN	Long-whiskered Owlet				X			
Zaratornis stresemanni	VU	White-cheeked Cotinga				X			
Zimmerius cinereicapilla	VU	Red-billed Tyrannulet		X		X	X		
Zimmerius villarejoi	VU	Mishana Tyrannulet				X			

Table 5.1.4. Fungi

Scientific name	Global threat IUCN	English name (if available)	Argentina	Bolivia	Chile	Peru	Ecuador	Colombia	Venezuela
Stilbohypoxylon macrosporum	CR		X						

Table 5.1.5. Mammals

Scientific name	Global threat IUCN	English name (if available)	Argentina	Bolivia	Chile	Peru	Ecuador	Colombia	Venezuela
Abrocoma boliviensis	CR	Bolivian Chinchilla Rat		X					
Aepeomys reigi	VU	Reig's Aepeomys							X
Akodon surdus	VU	Silent Grass Mouse				X			
Alouatta palliata	VU	Mantled Howling Monkey				X	X	X	
Amorphochilus schnablii	VU	Smoky Bat			X	X	X		
Anotomys leander	EN	Ecuadoran Ichthyomyine					X	X	
Aotus brumbacki	VU	Brumback's Night Monkey						X	X
Aotus griseimembra	VU	Grey-handed Night Monkey						X	X
Aotus lemurinus	VU	Colombian Night Monkey					X	X	X
Aotus nancymaae	VU	Nancy Ma's Night Monkey				X		X	
Ateles belzebuth	EN	White-bellied Spider Monkey				X	X	X	X
Ateles chamek	EN	Black-faced Black Spider Monkey		X		X		X	
Ateles fusciceps	EN	Brown-headed Spider Monkey					X	X	
Ateles hybridus	CR	Brown Spider Monkey						X	X
Balantiopteryx infusca	VU	Ecuadorian Sac-winged Bat					X	X	
Cacajao calvus	VU	Bald-headed Uacari				X		X	
Caenolestes condorensis	VU	Andean Caenolestid				X	X		
Caenolestes convelatus	VU	Blackish Shrew Opossum					X	X	
Caenolestes sangay	VU						X		
Callimico goeldii	VU	Goeldi's Monkey		X		X	X	X	
Cebus aequatorialis	CR	Ecuadorian White-fronted Capuchin				X	X		
Cebus leucocephalus	VU	Sierra de Perija White-fronted Capuchin						X	X
Chinchilla chinchilla	EN	Short-tailed Chinchilla	X	X	X				
Choeroniscus periosus	VU	Greater Long-tailed Bat					X	X	
Cryptotis aroensis	EN								X
Cryptotis meridensis	VU	Merida Small-eared Shrew							X
Ctenomys latro	EN	Mottled Tuco-tuco	X						
Ctenomys occultus	EN	Furtive Tuco-tuco	X						
Heteromys teleus	VU						X		
Hippocamelus antisensis	VU	Taruca	X	X	X	X			
Lagothrix flavicauda	CR	Peruvian Yellow-tailed Woolly Monkey				X			

Scientific name	Global threat IUCN	English name (if available)	Argentina	Bolivia	Chile	Peru	Ecuador	Colombia	Venezuela
Lagothrix lagothricha	VU	Common Woolly Monkey		X		X	X	X	X
Leopardus jacobita	EN	Andean Cat	X	X	X	X			
Leopardus tigrinus	VU	Northern Tiger Cat	X	X		X	X	X	X
Leptonycteris curasoae	VU	Curaçaoan Long-nosed Bat						X	X
Marmosa phaea	VU	Little Woolly Mouse Opossum				X	X	X	
Marmosops handleyi	CR	Handley's Slender Mouse Opossum						X	
Marmosops juninensis	VU	Junin Slender Opossum				X			
Mazama bricenii	VU	Merida Brocket						X	X
Mazama chunyi	VU	Peruvian Dwarf Brocket		X		X			
Mazama rufina	VU	Dwarf Red Brocket				X	X	X	
Mindomys hammondi	EN	Hammond's Rice Rat					X		
Mormopterus phrudus	VU	Incan Little Mastiff Bat				X			
Mustela felipei	VU	Colombian Weasel					X	X	
Myotis atacamensis	EN	Atacama Myotis			X	X			
Myrmecophaga tridactyla	VU	Giant Anteater	X	X		X	X	X	X
Nasuella meridensis	EN	Eastern Mountain Coati							X
Neomicroxus latebricola	EN	Ecuadorean Grass Mouse					X	X	
Neusticomys mussoi	VU	Musso's Fish-eating Rat							X
Neusticomys venezuelae	VU	Venezuelan Fish-eating Rat						X	X
Oryzomys gorgasi	EN							X	X
Oxymycterus hucucha	EN	Quechuan Hocicudo		X					
Oxymycterus wayku	VU		X						
Phyllotis definitus	EN	Definitive Leaf-eared Mouse				X			
Pithecia milleri	VU	Miller's Saki					X	X	
Plecturocebus modestus	EN	Beni Titi Monkey		X					
Plecturocebus oenanthe	CR	San Martin Titi Monkey				X			
Plecturocebus ornatus	VU	Ornate Titi Monkey						X	
Priodontes maximus	VU	Giant Armadillo	X	X		X	X	X	X
Pteronura brasiliensis	EN	Giant Otter		X		X	X	X	X
Punomys kofordi	VU					X			
Punomys lemminus	VU	Puna Mouse		X	X	X			
Rhogeessa minutilla	VU	Tiny Yellow Bat						X	X
Saccopteryx antioquensis	EN	Antioquian Sac-winged Bat						X	
Saguinus leucopus	EN	Silvery-brown Tamarin						X	
Saguinus oedipus	CR	Cotton-headed Tamarin						X	
Santamartamys rufodorsalis	CR	Red Crested Tree Rat						X	
Sigmodon inopinatus	VU	Unexpected Cotton Rat					X		
Sturnira nana	EN	Lesser Yellow-shouldered Bat				X	X		
Tapirus bairdii	EN	Baird's Tapir					X	X	
Tapirus pinchaque	EN	Mountain Tapir				X	X	X	
Tapirus terrestris	VU	Lowland Tapir	X	X		X	X	X	X
Tayassu pecari	VU	White-lipped Peccary	X	X		X	X	X	X
Thomasomys apeco	VU					X			
Thomasomys bombycinus	VU	Silky Oldfield Mouse						X	
Thomasomys eleusis	VU	Peruvian Oldfield Mouse				X			
Thomasomys hudsoni	VU						X		
Thomasomys hylophilus	VU	Woodland Oldfield Mouse						X	X

Scientific name	Global threat IUCN	English name (if available)	Argentina	Bolivia	Chile	Peru	Ecuador	Colombia	Venezuela
Thomasomys macrotis	VU					X			
Thomasomys monochromos	VU	Unicolored Oldfield Mouse						X	
Thomasomys onkiro	VU					X			
Thomasomys pyrrhonotus	VU	Thomas's Oldfield Mouse				X	X		
Thomasomys rosalinda	EN	Rosalinda's Oldfield Mouse				X			
Thomasomys ucucha	VU						X	X	
Tomopeas ravus	EN	Blunt-eared Bat				X			
Tremarctos ornatus	VU	Spectacled Bear		X		X	X	X	X
Trichechus manatus	VU	American Manatee						X	X
Vampyressa melissa	VU	Melissa's Yellow-eared Bat				X	X	X	X

Table 5.1.6. Bivalve mollusks and gastropods

Scientific name	Global threat IUCN	English name (if available)	Argentina	Bolivia	Chile	Peru	Ecuador	Colombia	Venezuela
Acostaea rivolii	CR							X	
Diplodontites olssoni	VU							X	
Heleobia andecola	VU			X		X			
Heleobia aperta	VU			X		X			
Heleobia ortoni	VU			X		X			
Pomacea ocanensis	CR							X	
Pomacea palmeri	VU							X	
Pomacea quinindensis	VU						X		
Rhamphopoma magnum	VU			X		X			

Table 5.1.7. Fish

Scientific name	Global threat IUCN	English name (if available)	Argentina	Bolivia	Chile	Peru	Ecuador	Colombia	Venezuela
Anablepsoides lineasoppilatae	VU					X			
Anablepsoides parlettei	VU					X			
Ancistrus bolivianus	VU			X					
Ancistrus marcapatae	EN					X			
Ancistrus tolima	EN							X	
Ancistrus vericaucanus	EN							X	
Andinoacara biseriatus	VU							X	
Anguilla rostrata	EN	American Eel							X
Aposturisoma myriodon	CR					X			
Apteronotus spurrellii	VU							X	
Astroblepus formosus	CR					X			

Scientific name	Global threat IUCN	English name (if available)	Argentina	Bolivia	Chile	Peru	Ecuador	Colombia	Venezuela
Astroblepus heterodon	VU							X	
Astroblepus latidens	VU							X	
Astroblepus supramollis	VU					X	X		
Astroblepus ubidiai	CR	Andean Catfish					X		
Astroblepus ventralis	VU							X	
Astyanax daguae	EN							X	
Attonitus bounites	VU					X			
Brycon fowleri	VU							X	
Brycon labiatus	EN							X	
Brycon moorei	VU							X	
Bryconamericus tolimae	VU							X	
Callichthys fabricioi	VU							X	
Chaetostoma branickii	VU					X			
Chaetostoma changae	EN					X			
Chaetostoma daidalmatos	EN					X			
Chaetostoma loborhynchos	EN					X			
Chaetostoma marmorescens	VU					X			
Chaetostoma palmeri	EN							X	
Chaetostoma stannii	EN								X
Chaetostoma stroumpoulos	EN					X			
Chaetostoma yurubiense	EN								X
Cichlasoma gephyrum	EN							X	
Cordylancistrus torbesensis	EN								X
Creagrutus gyrospilus	VU								X
Cynopotamus atratoensis	VU							X	
Farlowella venezuelensis	EN								X
Genycharax tarpon	VU							X	
Gymnotus ardilai	EN							X	
Gymnotus henni	VU							X	
Hyphessobrycon nigricinctus	VU			X		X			
Hyphessobrycon paucilepis	EN								X
Hyphessobrycon tuyensis	EN								X
Hypostomus annectens	VU						X	X	
Hypostomus wilsoni	VU							X	
Ichthyoelephas longirostris	VU							X	X
Imparfinis spurrellii	EN							X	
Knodus longus	VU			X					
Knodus shinahota	CR			X					
Leporinus muyscorum	VU							X	X
Oligosarcus schindleri	EN			X					
Orestias ctenolepis	VU			X		X			
Orestias gymnota	EN	Andean Killfish				X			

Scientific name	Global threat IUCN	English name (if available)	Argentina	Bolivia	Chile	Peru	Ecuador	Colombia	Venezuela
Orestias olivaceus	VU			X		X			
Orestias pentlandii	VU			X		X			
Orestias polonorum	EN					X			
Orestias silustani	VU			X		X			
Panaqolus albivermis	EN					X			
Parodon alfonsoi	EN							X	X
Phenacorhamdia taphorni	EN								X
Pimelodella macrocephala	VU							X	
Pimelodus grosskopfii	CR							X	
Poecilia dauli	VU								X
Pseudochalceus longianalis	VU						X	X	
Pseudocurimata patiae	EN							X	
Pseudoplatystoma magdaleniatum	EN							X	
Rhamdella montana	CR					X			
Rhamdia guasarensis	CR								X
Rhamdia xetequepeque	CR					X			
Rhizosomichthys totae	CR							X	
Sciades parkeri	VU	Gillbacker Sea Catfish							X
Sturisomatichthys frenatus	CR						X		
Tahuantinsuyoa chipi	VU					X			
Trichomycterus regani	VU							X	
Trichomycterus taeniops	EN					X			
Trichomycterus transandianus	VU							X	
Trichomycterus unicolor	EN							X	
Trichomycterus venulosus	CR							X	
Trichomycterus weyrauchi	EN					X			

Table 5.1.8. Plants (Monocotyledons, Dicotyledons and aquatic or semi-aquatic plants)

Scientific name	Global threat IUCN	English name (if available)	Argentina	Bolivia	Chile	Peru	Ecuador	Colombia	Venezuela
Acaulimalva oriastrum	VU			X					
Acaulimalva steinbachii	EN			X					
Agave pax	CR							X	
Anthopterus ecuadorensis	EN						X		
Anthopterus verticillatus	EN						X		
Apinagia boliviana	VU			X					
Apinagia peruviana	CR					X			

Scientific name	Global threat IUCN	English name (if available)	Argentina	Bolivia	Chile	Peru	Ecuador	Colombia	Venezuela
Aschersoniodoxa peruviana	EN					X			
Austrocylindropuntia lagopus	VU					X			
Baccharis davidsonii	CR					X			
Baccharis hieronymi	VU						X		
Bejaria nana	EN							X	X
Brachyotum angustifolium	VU			X		X			
Brayopsis diapensioides	EN			X					
Brayopsis monimocalyx	VU		X	X		X			
Browningia altissima	VU					X			
Buddleja cardenasii	EN			X					
Cavendishia dendrophila	CR							X	
Cavendishia jardinensis	CR							X	
Cavendishia lebroniae	EN						X		
Cavendishia longirachis	EN							X	
Cavendishia macrocephala	VU							X	
Cavendishia nuda	CR							X	
Cavendishia orthosepala	EN						X		
Cavendishia parviflora	EN						X		
Cavendishia sessiliflora	EN							X	
Cavendishia sophoclesioides	CR							X	
Cedrela odorata	VU	Spanish Cedar	X	X		X	X	X	X
Centropogon gloriosus	EN			X					
Ceratostema bracteolatum	EN						X		
Ceratostema glans	CR						X		
Ceratostema lanceolatum	EN						X		
Ceratostema lanigerum	EN						X		
Ceratostema macbrydeorum	CR						X		
Ceratostema megabracteatum	EN						X		
Ceratostema megalobum	CR						X		
Ceratostema nodosum	VU						X		
Ceratostema nubigena	EN						X		
Ceratostema pendens	EN						X		
Ceratostema pensile	CR						X		
Ceratostema pubescens	EN						X		
Ceratostema silvicola	EN						X		
Ceratostema ventricosum	EN						X		
Cereus fricii	VU								X
Cereus vargasianus	VU					X			
Coespeletia laxiflora	CR							X	
Corryocactus erectus	VU					X			
Costus geothyrsus	CR						X		
Costus zamoranus	EN						X		
Dactylocardamum polyspermum	EN					X			
Dendrophorbium acuminatissimum	VU			X					

Scientific name	Global threat IUCN	English name (if available)	Argentina	Bolivia	Chile	Peru	Ecuador	Colombia	Venezuela
Digitaria cardenasiana	EN							X	
Diogenesia amplectens	EN						X		
Diogenesia gracilipes	CR						X		
Diogenesia oligantha	EN						X		
Diplostephium cinereum	EN			X	X	X			
Disterigma bracteatum	CR						X		
Disterigma campii	EN						X		
Disterigma micranthum	CR						X		
Draba matthioloides	VU					X			
Draba ochropetala	VU					X			
Echinopsis albispinosa	VU		X						
Echinopsis ancistrophora	VU		X	X					
Echinopsis backebergii	VU			X		X			
Echinopsis chrysantha	VU		X						
Echinopsis famatinensis	VU		X						
Echinopsis terscheckii	VU		X	X					
Echinopsis thelegona	VU		X						
Echinopsis thelegonoides	VU		X						
Englerocharis ancashensis	EN					X			
Espeletia annemariana	EN							X	
Espeletia arbelaezii	VU							X	
Espeletia ariana	VU							X	
Espeletia azucarina	CR							X	
Espeletia brachyaxiantha	EN							X	
Espeletia brassicoidea	VU							X	
Espeletia cachaluensis	CR							X	
Espeletia canescens	EN							X	
Espeletia cayetana	EN							X	
Espeletia chocontana	EN							X	
Espeletia cleefii	EN							X	
Espeletia conglomerata	VU							X	
Espeletia discoidea	EN							X	
Espeletia dugandii	CR							X	
Espeletia episcopalis	VU							X	
Espeletia estanislana	EN							X	
Espeletia formosa	EN							X	
Espeletia idroboi	EN							X	
Espeletia incana	VU							X	
Espeletia jaramilloi	VU							X	
Espeletia mirabilis	CR							X	
Espeletia miradorensis	CR							X	
Espeletia nemekenei	EN							X	
Espeletia oswaldiana	CR							X	
Espeletia paipana	CR							X	
Espeletia perijaensis	EN							X	X
Espeletia pescana	VU							X	
Espeletia pulcherrima	EN							X	
Espeletia raquirensis	CR							X	
Espeletia roberti	EN							X	
Espeletia rositae	EN							X	
Espeletia schultesiana	VU							X	
Espeletia soroca	CR							X	
Espeletia standleyana	VU							X	

Scientific name	Global threat IUCN	English name (if available)	Argentina	Bolivia	Chile	Peru	Ecuador	Colombia	Venezuela
Espeletia steyermarkii	CR							X	X
Espeletia summapacis	EN							X	
Espeletia tibamoensis	CR							X	
Espeletia tunjana	EN							X	
Espeletiopsis betancurii	CR							X	
Espeletiopsis caldasii	CR							X	
Espeletiopsis diazii	CR							X	
Espeletiopsis funckii	EN							X	
Espeletiopsis garciae	VU							X	
Espeletiopsis insignis	EN							X	
Espeletiopsis jimenez-quesadae	VU							X	
Espeletiopsis purpurascens	EN							X	X
Espeletiopsis rabanalensis	EN							X	
Espeletiopsis sanchezii	EN							X	
Espeletiopsis sclerophylla	EN							X	
Fabiana squamata	EN			X	X				
Freziera apolobambensis	CR			X					
Gaultheria stereophylla	CR						X		
Gentianella alborosea	EN					X			
Gentianella armerioides	EN			X		X			
Gentianella bockii	VU			X					
Gentianella boliviana	VU			X					
Gentianella chrysantha	VU			X					
Gentianella formosissima	VU					X			
Gentianella palcana	EN			X					
Gentianella raimondiana	EN					X			
Gentianella sagasteguii	VU					X			
Gentianella vargasii	VU					X			
Gentianella weigendii	EN					X			
Gentianella zaratei	VU			X					
Greigia collina	VU							X	
Greigia danielii	VU							X	
Greigia kessleri	VU			X					
Greigia nubigena	CR							X	
Greigia ocellata	CR							X	X
Guzmania goudotiana	VU							X	
Guzmania palustris	EN							X	
Gymnocalycium marianae	VU		X						
Gynoxys compressissima	VU			X		X			
Gynoxys neovelutina	EN			X					
Hedyosmum maximum	VU			X					
Hypericum callacallanum	VU					X			
Isoetes dispora	CR					X			
Isoetes ecuadoriensis	VU					X	X		
Isoetes herzogii	VU			X					
Isoetes hewitsonii	CR					X			
Isoetes parvula	VU					X			
Isoetes saracochensis	VU					X			
Krapfia gigas	EN					X			

Scientific name	Global threat IUCN	English name (if available)	Argentina	Bolivia	Chile	Peru	Ecuador	Colombia	Venezuela
Krapfia grace-servatiae	CR					X			
Krapfia haemantha	VU			X		X			
Krapfia macropetala	EN					X			
Krapfia weberbaueri	EN					X			
Laccopetalum giganteum	VU					X			
Libanothamnus divisoriensis	EN							X	X
Libanothamnus tamanus	VU							X	X
Loricaria unduaviensis	EN			X					
Macleania alata	EN						X		
Macleania coccoloboides	VU						X		
Macleania crassa	VU							X	
Macleania dodsonii	EN						X		
Macleania ericae	VU						X		
Macleania maldonadensis	EN						X	X	
Macleania mollis	VU					X	X		
Macleania pubiflora	VU							X	
Macleania subsessilis	VU						X		
Magnolia calimaensis	CR							X	
Magnolia cararensis	CR							X	
Magnolia colombiana	CR							X	
Magnolia gilbertoi	EN							X	
Magnolia henaoi	EN							X	
Magnolia jardinensis	CR							X	
Magnolia katiorum	CR							X	
Magnolia mahechae	EN							X	
Magnolia polyhypsophylla	CR							X	
Magnolia silvioi	EN							X	
Magnolia urraoensis	EN							X	
Magnolia virolinensis	CR							X	
Magnolia wolfii	CR							X	
Matucana krahnii	VU					X			
Matucana oreodoxa	VU					X			
Matucana paucicostata	VU					X			
Melocactus schatzlii	VU							X	X
Miconia recondita	VU			X					
Mila caespitosa	VU					X			
Monnina autraniana	VU			X					
Nototriche lanata	EN			X		X			
Nototriche lopezii	EN					X			
Nototriche peruviana	EN					X			
Nototriche sajamensis	VU			X	X	X			
Nototriche tovari	EN					X			
Nototriche turritella	VU			X	X	X			
Nymphoides herzogii	EN			X					
Ocotea comata	VU			X		X			
Opuntia schumannii	VU							X	X
Oreanthes ecuadorensis	EN						X		
Oreanthes fragilis	VU						X		
Oreanthes glanduliferus	EN						X		
Oreanthes hypogaeus	EN						X		
Oreopanax thaumasiophyllus	EN			X					

Scientific name	Global threat IUCN	English name (if available)	Argentina	Bolivia	Chile	Peru	Ecuador	Colombia	Venezuela
Orthaea caudata	CR							X	
Orthaea ecuadorensis	EN						X		
Orthaea oriens	VU						X		
Ourisia cotapatensis	VU			X					
Parastrephia teretiuscula	VU			X	X				
Pentacalia lewisii	VU			X					
Pernettya hirta	EN							X	
Pitcairnia lindae	CR							X	
Pitcairnia petraea	EN							X	
Plutarchia coronaria	VU							X	
Plutarchia dasyphylla	EN							X	
Plutarchia dichogama	EN							X	
Plutarchia ecuadorensis	EN						X		
Plutarchia guascensis	VU							X	
Plutarchia minor	EN							X	
Plutarchia miranda	EN							X	
Plutarchia monantha	EN							X	
Plutarchia pubiflora	EN							X	
Plutarchia rigida	VU							X	
Psammisia aurantiaca	EN						X		
Psammisia flaviflora	EN						X		
Psammisia incana	EN						X		
Psammisia orientalis	EN						X		
Puya aequatorialis	VU						X		
Puya angelensis	EN						X		
Puya angulonis	VU					X			
Puya araneosa	EN					X			
Puya aristeguietae	VU							X	X
Puya barkleyana	EN							X	
Puya boyacana	CR							X	
Puya brackeana	CR						X		
Puya cleefii	CR							X	
Puya cochabambensis	VU			X					
Puya compacta	EN						X		
Puya coriacea	EN					X			
Puya cuatrecasasii	VU							X	
Puya dichroa	CR							X	
Puya exigua	EN						X		
Puya exuta	EN							X	
Puya fastuosa	EN					X	X		
Puya fosteriana	EN			X					
Puya furfuracea	CR							X	
Puya gargantae	EN							X	
Puya grantii	CR							X	X
Puya grubbii	EN							X	
Puya hirtzii	CR						X		
Puya ibischii	EN			X					
Puya joergensenii	EN						X		
Puya killipii	VU							X	X
Puya loca	EN							X	
Puya longispina	EN						X		
Puya maculata	VU						X		
Puya medica	VU					X			
Puya navarroana	EN						X		
Puya nigrescens	CR					X			
Puya nutans	EN						X		
Puya obconica	EN						X		

Scientific name	Global threat IUCN	English name (if available)	Argentina	Bolivia	Chile	Peru	Ecuador	Colombia	Venezuela
Puya ochroleuca	EN							X	
Puya parviflora	EN						X		
Puya pratensis	EN					X			
Puya ramonii	CR					X			
Puya rauhii	EN					X			
Puya roldanii	EN							X	
Puya roseana	CR						X		
Puya sanctae-martae	EN							X	X
Puya santanderensis	CR							X	
Puya simulans	CR					X			
Puya sodiroana	EN						X		
Puya tillii	EN						X		
Puya vestita	VU						X	X	
Pycnophyllopsis cryptantha	EN					X			
Pycnophyllopsis keraiopetala	EN			X					
Pycnophyllum aristatum	EN					X			
Pycnophyllum holleanum	EN					X			
Pycnophyllum spathulatum	VU			X	X				
Ruilopezia cardonae	VU							X	
Semiramisia pulcherrima	EN							X	
Senecio sanmarcosensis	VU					X			
Siphocampylus siberiensis	VU			X					
Sphyrospermum flaviflorum	CR						X		
Sphyrospermum haughtii	CR						X		
Sphyrospermum microphyllum	CR						X		
Sphyrospermum muscicola	CR						X		
Sphyrospermum sodiroi	VU						X		
Stangea erikae	EN					X			
Stangea paulae	VU			X	X	X			
Stangea rhizantha	VU					X			
Symplocos robusta	EN			X					
Tamania chardonii	EN							X	X
Themistoclesia campii	CR						X		
Themistoclesia inflata	CR						X		
Themistoclesia mucronata	VU							X	
Themistoclesia peruviana	VU			X		X			
Themistoclesia recurva	VU							X	
Themistoclesia rostrata	VU							X	
Themistoclesia unduavensis	VU			X					
Thibaudia fallax	CR							X	
Thibaudia gunnarii	VU						X		
Thibaudia inflata	VU						X		
Thibaudia joergensenii	EN						X		
Thibaudia lateriflora	EN						X		
Thibaudia litensis	VU						X		

Scientific name	**Global threat IUCN**	**English name (if available)**	**Argentina**	**Bolivia**	**Chile**	**Peru**	**Ecuador**	**Colombia**	**Venezuela**
Thibaudia sessiliflora	VU						X		
Thibaudia steyermarkii	VU						X		
Tillandsia breviturneri	EN							X	
Tillandsia chartacea	CR							X	
Tillandsia cuatrecasasii	CR							X	
Tillandsia fusiformis	EN						X	X	
Tillandsia pallescens	VU							X	
Tillandsia reversa	EN							X	
Tillandsia romeroi	EN							X	X
Tillandsia sigmoidea	EN							X	X
Tillandsia suescana	EN							X	
Tillandsia truxillana	CR					X			
Tripsacum peruvianum	EN					X	X		
Vaccinium distichum	EN						X		
Valeriana johannae	EN			X		X			
Viola kermesina	EN					X			
Weberbauera ayacuchoensis	EN					X			
Weberbauera rosulans	EN					X			
Weinmannia yungasensis	VU			X					
Werneria glaberrima	VU		X	X	X				
Werneria staticifolia	VU		X	X		X			
Xanthosoma guttatum	EN							X	
Xanthosoma narinoense	CR							X	
Xanthosoma tarapotense	EN					X			

Table 5.1.9. Reptiles

Scientific name	Global threat IUCN	English name (if available)	Argentina	Bolivia	Chile	Peru	Ecuador	Colombia	Venezuela
Ameiva provitaae	EN								X
Anadia antioquensis	VU							X	
Anadia blakei	EN	Blake's Anadia							X
Anadia brevifrontalis	EN	Shorthead Anadia							X
Anadia pamplonensis	EN	Pamplona Anadia						X	
Anadia pariaensis	EN								X
Andinosaura aurea	VU						X		
Andinosaura vespertina	VU						X		
Anolis maculigula	VU	Rueda's Anole						X	
Anolis otongae	VU						X		
Anolis parilis	VU						X		
Anolis podocarpus	VU						X		
Anolis proboscis	EN	Proboscis Anole					X		
Anolis ruizii	EN							X	
Anolis vanzolini	CR						X		
Aspronema cochabambae	VU			X					
Atractus carrioni	EN	Parker's Ground Snake				X	X		
Atractus duboisi	EN						X		
Atractus microrhynchus	VU					X	X		
Atractus modestus	VU	Modest Ground Snake					X		
Atractus multidentatus	CR								X
Atractus nicefori	VU	Northern Ground Snake						X	
Atractus occidentalis	EN	Western Ground Snake					X		
Atractus paucidens	VU	Despax's Ground Snake					X		
Atractus roulei	VU	Roule's Ground Snake					X		
Bothrocophias campbelli	VU						X	X	
Bothrops lojanus	VU	Lojan Lancehead				X	X		
Bothrops medusa	EN	Venezuela Forest Pit Viper							X
Bothrops osbornei	VU					X	X		
Caretta caretta	VU	Loggerhead Turtle						X	X
Chelonia mydas	EN	Green Turtle			X	X	X	X	X
Coniophanes dromiciformis	VU	Peters' Running Snake					X		
Contomastix vittata	VU			X					
Corallus blombergi	EN	Blomber's Tree Boa					X	X	
Dendrophidion boshelli	CR	Hoshell's Forest Racer						X	
Dermochelys coriacea	VU	Leatherback						X	X
Dipsas elegans	VU						X		
Dipsas ellipsifera	EN						X		
Dipsas oligozonata	VU						X		
Dipsas williamsi	VU	Williams' Tree Snake				X			
Drymoluber apurimacensis	CR	Brazilian Woodland Racer				X			
Echinosaura brachycephala	EN						X		
Echinosaura keyi	VU	Key Tegu					X		
Emmochliophis miops	CR						X		
Enyalioides oshaughnessyi	VU	Red-eyed Woodlizard					X	X	
Enyalioides rubrigularis	VU	Red-throated Woodlizard				X	X		
Enyalioides touzeti	VU	Touzet's Woodlizard				X	X		
Epictia striatula	VU		X	X					

Scientific name	Global threat IUCN	English name (if available)	Argentina	Bolivia	Chile	Peru	Ecuador	Colombia	Venezuela
Eretmochelys imbricata	CR	Hawksbill Turtle	X		X	X	X	X	X
Euspondylus monsfumus	CR								X
Gonatodes purpurogularis	EN								X
Gonatodes seigliei	EN	Estados Sucre Gecko							X
Holcosus orcesi	CR	Peters' Ameiva					X		
Lepidoblepharis conolepis	EN						X		
Lepidoblepharis grandis	VU						X		
Lepidochelys olivacea	VU	Olive Ridley			X	X	X	X	X
Liolaemus aparicioi	CR			X					
Liolaemus audituvelatus	VU				X				
Liolaemus fabiani	EN	Yanez's Tree Iguana			X				
Liolaemus fittkaui	VU			X					
Liolaemus forsteri	EN	Forster's Tree Iguana		X					
Liolaemus halonastes	VU		X						
Liolaemus isabelae	EN				X				
Liolaemus poconchilensis	EN				X	X			
Liolaemus scapularis	EN	Shoulder Tree Iguana	X						
Liolaemus variegatus	VU	Variegated Tree Iguana		X					
Macropholidus annectens	EN	Parker's Pholidobolus					X		
Mastigodryas amarali	VU	Amaral's Tropical Racer							X
Micrurus catamayensis	EN	Catamayo Coral Snake					X		
Micrurus medemi	CR							X	
Micrurus meridensis	EN	Merida Coral Snake							X
Micrurus sangilensis	VU	Santander Coral Snake						X	
Morunasaurus annularis	VU	Ringed Spinytail Iguana					X	X	
Morunasaurus groi	EN	Dunn's Spinytail Iguana						X	
Panopa croizati	CR	Horton's Mabuya							X
Petracola ventrimaculatus	VU	Spotted Lightbulb Lizard				X			
Phyllodactylus delsolari	EN					X			
Phyllodactylus johnwrighti	EN	Huancabamba River Leaf-toed Gecko				X			
Phyllodactylus leoni	VU						X		
Phyllodactylus lepidopygus	VU	Western Leaf-toed Gecko				X			
Phyllodactylus thompsoni	EN					X			
Podocnemis lewyana	CR	Magdalena River Turtle						X	
Polychrus peruvianus	VU					X	X		
Potamites ocellatus	VU			X					
Proctoporus cephalolineatus	EN								X
Ptychoglossus danieli	CR							X	
Riama anatoloros	VU						X		
Riama aurea	VU						X		
Riama balneator	EN						X		
Riama cashcaensis	EN	Kizorian's Lightbulb Lizard					X		
Riama colomaromani	EN						X		
Riama columbiana	EN	Colombian Lightbulb Lizard						X	
Riama crypta	EN						X		
Riama kiziriani	EN						X		
Riama labionis	EN						X		
Riama laevis	VU	Shiny Lightbulb Lizard						X	

Scientific name	Global threat IUCN	English name (if available)	Argentina	Bolivia	Chile	Peru	Ecuador	Colombia	Venezuela
Riama oculata	EN	Tropical Lightbulb Lizard					X		
Riama orcesi	VU						X		
Riama petrorum	EN						X		
Riama raneyi	VU						X		
Riama rhodogaster	CR								X
Riama simotera	EN	O'Shaughnessy's Lightbulb Lizard					X	X	
Riama stigmatoral	VU						X		
Riama unicolor	VU	Drab Lightbulb Lizard					X	X	
Riama vespertina	VU						X		
Saphenophis sneiderni	EN	Saphenophis Snake						X	
Sphaerodactylus scapularis	EN	Boulenger's Least Gecko					X		
Stenocercus arndti	EN					X			
Stenocercus carrioni	EN	Parker's Whorltail Iguana					X		
Stenocercus chinchaoensis	VU	Chinchao Whorltail Lizard				X			
Stenocercus festae	VU	Peracca's Whorltail Iguana					X		
Stenocercus haenschi	CR	Haensch's Whorltail Iguana					X		
Stenocercus limitaris	VU					X	X		
Stenocercus ornatus	VU	Girard's Whorltail Iguana					X		
Stenocercus rhodomelas	VU	Red-black Whorltail Iguana					X		
Stenocercus simonsii	EN	Simons' Whorltail Iguana					X		
Stenocercus stigmosus	VU					X			
Stenocercus torquatus	VU					X			
Stenocercus varius	EN	Keeled Whorltail Iguana					X		
Synophis bicolor	EN						X		
Synophis plectovertebralis	CR							X	
Taeniophallus nebularis	CR								X
Tantilla insulamontana	CR	Mountain Centipede Snake					X		
Tantilla petersi	CR	Peters' Black-headed Snake					X		
Trilepida anthracina	VU	Bailey's Blind Snake					X		

Appendix 5.2. Characteristics of the KBAs in the Tropical Andes Hotspot

*Index of anthropogenic impacts. Scale from 0 to 1 (1=high).

Country	KBA name	CEPF Code	Area (hectares)	Protection status	Corridor	RBV	Another	Sum of water balance (mm/year)	Water balance classification	Total carbon stored (t C)	Carbon stock classification	IIA *
Argentina	Abra Grande	ARG1	32,429	Partially protected	Tarija-Jujuy	0.06	IBA	133,461	Low	22,098	Low	0.33
Argentina	Acambuco	ARG2	23,475	Partially protected	Tarija-Jujuy	0.07	IBA	191,653	Low	61,184	Low	0.23
Argentina	Alto Calilegua	ARG3	774	Protected	Tarija-Jujuy	0.12	IBA	4,229	Low	940	Low	0.00
Argentina	Caspalá-Santa Ana	ARG4	14,612	Protected	Tarija-Jujuy	0.06	IBA	8,133	Low	334	Low	0.06
Argentina	Cerro Negro de San Antonio	ARG5	9,934	Unprotected	-----	0.08	IBA	13,892	Low	8,673	Low	0.07
Argentina	Chaco de Tartagal	ARG66	50,125	Unprotected	Tarija-Jujuy	0.03	IBA	119,528	Low	69,859	Low	0.26
Argentina	Cuesta de las Higuerillas	ARG6	7,157	Unprotected	-----	0.08	IBA	7,446	Low	525	Low	0.14
Argentina	Cuesta del Clavillo	ARG7	9,144	Partially protected	Yungas de Tucumán	0.08	IBA	19,633	Low	28,059	Low	0.11
Argentina	Cuesta del Obispo	ARG8	25,434	Unprotected	-----	0.05	IBA	12,767	Low	30,636	Low	0.13
Argentina	Cuesta del Totoral	ARG9	7,733	Unprotected	-----	0.06	IBA	29,115	Low	2,378	Low	0.28
Argentina	El Fuerte y Santa Clara	ARG10	17,891	Unprotected	-----	0.06	IBA	121,114	Low	49,263	Low	0.17
Argentina	El Infiernillo	ARG11	707	Unprotected	Yungas de Tucumán	0.09	IBA	953	Low	0	Low	0.18
Argentina	Fincas Santiago y San Andrés	ARG12	32,942	Protected	Tarija-Jujuy	0.10	IBA	248,505	Low	93,515	Low	0.14
Argentina	Itiyuro-Tuyunti	ARG13	20,947	Partially protected	Tarija-Jujuy	0.05	IBA	148,471	Low	57,785	Low	0.07
Argentina	La Cornisa	ARG14	19,444	Protected	-----	0.09	IBA	114,281	Low	27,474	Low	0.37
Argentina	La Porcelana	ARG15	13,276	Partially protected	Tarija-Jujuy	0.05	IBA	48,556	Low	30,553	Low	0.14
Argentina	Laguna El Peinado	ARG67	7,803	Protected	-----	0.01	IBA	-14,590	Low	92	Low	0.00

Country	KBA name	CEPF Code	Area (hectares)	Protection status	Corridor	RBV	Another	Sum of water balance (mm/year)	Water balance classification	Total carbon stored (t C)	Carbon stock classification	IIA *
Argentina	Laguna Grande	ARG16	7,671	Protected	-----	0.00	IBA	-12,981	Low	387	Low	0.00
Argentina	Laguna Guayatayoc	ARG17	108,520	Unprotected	-----	0.02	IBA	-316,025	Low	1,833	Low	0.14
Argentina	Laguna La Alumbrera	ARG18	10,796	Unprotected	-----	0.01	IBA	-24,784	Low	236	Low	0.15
Argentina	Laguna Purulla	ARG19	7,796	Protected	-----	0.01	IBA	-9,013	Low	103	Low	0.00
Argentina	Lagunas Runtuyoc-Los Enamorados	ARG20	2,493	Unprotected	-----	0.02	IBA	-8,434	Low	326	Low	0.29
Argentina	Lagunas San Miguel y El Sauce	ARG21	2,213	Unprotected	-----	0.09	IBA	13,739	Low	6,056	Low	0.26
Argentina	Lagunillas	ARG22	550	Protected	-----	0.02	IBA	-1,427	Low	16	Low	0.08
Argentina	Llanos de Jagüé	ARG68	45,842	Unprotected	-----	0.00	IBA	-23,425	Low	6,617	Low	0.00
Argentina	Lotes 32 y 33, Maíz Gordo	ARG23	23,031	Partially protected	-----	0.03	IBA	25,138	Low	25,704	Low	0.24
Argentina	Luracatao y Valles Calchaquíes	ARG24	267,288	Unprotected	-----	0.02	IBA	-246,250	Low	41,500	Low	0.09
Argentina	Monumento Natural Laguna de Los Pozuelos	ARG25	15,870	Protected	-----	0.03	IBA	-55,936	Low	167	Low	0.14
Argentina	Pampichuela	ARG26	1,827	Protected	Tarija-Jujuy	0.10	IBA	14,910	Low	4,169	Low	0.20
Argentina	Parque Nacional Baritú	ARG27	65,123	Protected	Tarija-Jujuy	0.12	IBA	636,564	Low	223,610	Low	0.06
Argentina	Parque Nacional Calilegua	ARG28	68,333	Protected	Tarija-Jujuy	0.12	IBA	403,696	Low	235,066	Low	0.05
Argentina	Parque Nacional Campo de los Alisos	ARG29	9,043	Protected	Yungas de Tucumán	0.07	IBA	8,955	Low	18,404	Low	0.06
Argentina	Parque Nacional El Rey	ARG30	35,915	Protected	-----	0.06	IBA	187,725	Low	138,623	Low	0.03
Argentina	Parque Nacional Los Cardones	ARG69	58,579	Protected	-----	0.03	IBA	-95,538	Low	5,812	Low	0.14
Argentina	Parque Provincial Cumbres Calchaquíes	ARG31	61,224	Protected	Yungas de Tucumán	0.06	IBA	-149,600	Low	18,052	Low	0.05
Argentina	Parque Provincial La Florida	ARG32	8,392	Protected	Yungas de Tucumán	0.10	IBA	7,141	Low	11,220	Low	0.00

Country	KBA name	CEPF Code	Area (hectares)	Protection status	Corridor	RBV	Another	Sum of water balance (mm/year)	Water balance classification	Total carbon stored (t C)	Carbon stock classification	IIA *
Argentina	Parque Provincial Laguna Pintascayoc	ARG33	14,227	Protected	Tarija-Jujuy	0.09	IBA	151,164	Low	40,734	Low	0.10
Argentina	Parque Provincial Los Ñuñorcos y Reserva Natural Quebrada del Portugués	ARG34	6,760	Protected	Yungas de Tucumán	0.11	IBA	15,838	Low	16,413	Low	0.06
Argentina	Pueblo Nuevo	ARG35	1,750	Protected	-----	0.01	AZE	-6,151	Low	331	Low	0.33
Argentina	Quebrada de Escoipe	ARG70	637	Unprotected	-----	0.03	AZE	-519	Low	0	Low	0.24
Argentina	Quebrada de las Conchas	ARG71	54,564	Partially protected	Yungas de Tucumán	0.08	IBA	11,383	Low	8,351	Low	0.05
Argentina	Quebrada del Toro	ARG37	54,938	Unprotected	-----	0.04	IBA AZE	29,795	Low	9,335	Low	0.12
Argentina	Queñoales de Santa Catalina	ARG36	9,729	Protected	-----	0.02	IBA	-48,035	Low	62	Low	0.35
Argentina	Reserva de la Biósfera Parque Nacional San Guillermo	ARG72	848,373	Protected	-----	0.01	IBA	-792,446	Low	69,673	Low	0.06
Argentina	Reserva Natural de La Angostura	ARG41	1,507	Protected	Yungas de Tucumán	0.12	IBA	7,337	Low	0	Low	0.29
Argentina	Reserva Natural Las Lancitas	ARG42	12,008	Partially protected	-----	0.06	IBA	56,220	Low	35,128	Low	0.20
Argentina	Reserva Provincial de Uso Múltiple Laguna Leandro	ARG43	369	Protected	Tarija-Jujuy	0.06	IBA	992	Low	40	Low	0.08
Argentina	Reserva Provincial Laguna Brava	ARG73	389,369	Protected	-----	0.00	IBA	-589,583	Low	34,586	Low	0.02
Argentina	Reserva Provincial Olaroz-Cauchari	ARG44	190,097	Protected	Puna Trinacional	0.01	IBA	-637,044	Low	8,772	Low	0.14
Argentina	Reserva Provincial Santa Ana	ARG45	15,586	Protected	Yungas de Tucumán	0.05	IBA	40,737	Low	55,779	Low	0.04
Argentina	Reserva Provincial y de la Biósfera Laguna Blanca	ARG46	522,754	Protected	-----	0.01	IBA	-722,044	Low	17,082	Low	0.02
Argentina	Río Los Sosa	ARG38	2,436	Protected	Yungas de Tucumán	0.06	IBA	15,477	Low	6,311	Low	0.36

Country	KBA name	CEPF Code	Area (hectares)	Protection status	Corridor	RBV	Another	Sum of water balance (mm/year)	Water balance classification	Total carbon stored (t C)	Carbon stock classification	IIA *
Argentina	Río Santa María	ARG39	9,339	Protected	Tarija-Jujuy	0.08	IBA	67,519	Low	26,945	Low	0.05
Argentina	Río Seco	ARG40	30,654	Protected	Tarija-Jujuy	0.07	IBA	200,042	Low	85,177	Low	0.05
Argentina	Salar del Hombre Muerto	ARG47	58,810	Unprotected	-----	0.01	IBA	-161,903	Low	393	Low	0.07
Argentina	San Francisco-Río Jordán	ARG48	9,894	Protected	Tarija-Jujuy	0.12	IBA	91,876	Low	25,297	Low	0.09
Argentina	San Lucas	ARG49	25,925	Partially protected	Tarija-Jujuy	0.05	IBA	11,390	Low	8,642	Low	0.00
Argentina	Santa Victoria, Cañani y Cayotal	ARG50	25,542	Partially protected	Tarija-Jujuy	0.07	IBA	49,892	Low	18,029	Low	0.07
Argentina	Sierra de Ambato	ARG51	76,195	Unprotected	-----	0.06	IBA	-76,095	Low	1,780	Low	0.00
Argentina	Sierra de Medina	ARG52	38,389	Unprotected	Yungas de Tucumán	0.08	IBA	177,559	Low	65,384	Low	0.10
Argentina	Sierra de Metán	ARG74	61,707	Unprotected	Yungas de Tucumán	0.11	IBA	126,474	Low	20,266	Low	0.01
Argentina	Sierra de San Javier	ARG53	11,792	Protected	Yungas de Tucumán	0.07	IBA	107,975	Low	27,505	Low	0.32
Argentina	Sierra de Santa Victoria	ARG54	38,982	Unprotected	Tarija-Jujuy	0.02	IBA	-9,006	Low	2,591	Low	0.21
Argentina	Sierra de Zenta	ARG55	37,688	Protected	Tarija-Jujuy	0.09	IBA	86,856	Low	41,366	Low	0.04
Argentina	Sierra Rosario de la Frontera	ARG75	26,563	Unprotected	Yungas de Tucumán	0.06	IBA	-13,556	Low	35,305	Low	0.07
Argentina	Sierras de Carahuasi	ARG56	102,694	Partially protected	Yungas de Tucumán	0.05	IBA	-57,202	Low	26,266	Low	0.01
Argentina	Sierras de Puesto Viejo	ARG57	9,075	Unprotected	-----	0.08	IBA	38,785	Low	20,060	Low	0.24
Argentina	Sistema de lagunas de Vilama-Pululos	ARG58	303,783	Protected	Puna Trinacional	0.01	IBA	-940,282	Low	4,270	Low	0.05
Argentina	Socompa y Llullaillaco	ARG59	87,293	Protected	-----	0.01	IBA	-184,889	Low	4,293	Low	0.05
Argentina	Tiraxi y Las Capillas	ARG60	13,008	Protected	-----	0.11	IBA	82,480	Low	38,972	Low	0.20
Argentina	Trancas	ARG61	32,091	Unprotected	Yungas de Tucumán	0.10	IBA	13,739	Low	18,154	Low	0.24

Country	KBA name	CEPF Code	Area (hectares)	Protection status	Corridor	RBV	Another	Sum of water balance (mm/year)	Water balance classification	Total carbon stored (t C)	Carbon stock classification	IIA *
Argentina	Valle Colorado y Valle Grande	ARG62	9,743	Protected	Tarija-Jujuy	0.10	IBA	46,976	Low	11,703	Low	0.22
Argentina	Valle de Tafi	ARG63	33,550	Unprotected	Yungas de Tucumán	0.10	AZE	55,499	Low	7,808	Low	0.18
Argentina	Yala	ARG64	4,089	Protected	-----	0.06	IBA	18,171	Low	10,789	Low	0.35
Argentina	Yavi y Yavi Chico	ARG65	4,569	Unprotected	-----	0.02	IBA	-15,996	Low	85	Low	0.29
Argentina	Yuto y Vinalito	ARG76	31,277	Unprotected	Tarija-Jujuy	0.08	IBA	58,340	Low	58,453	Low	0.35
Bolivia	Anexo Tuni-Condoriri†	BOL57	19,462	Unprotected	Madidi-Pilón Lajas-Cotapata	0.14		124,243	Low	1,119	Low	0.27
Bolivia	Apolo	BOL3	177,302	Partially protected	Madidi-Pilón Lajas-Cotapata	0.14	IBA AZE	2,864,344	Medium	226,539	Low	0.16
Bolivia	Azurduy	BOL4	133,353	Unprotected	-----	0.03	IBA	1,021,377	Low	159,715	Low	0.17
Bolivia	Bosque de Polylepis de Madidi	BOL5	94,613	Protected	Madidi-Pilón Lajas-Cotapata	0.21	IBA	1,272,454	Low	164,437	Low	0.16
Bolivia	Bosque de Polylepis de Taquesi	BOL8	3,455	Unprotected	Madidi-Pilón Lajas-Cotapata	0.29	IBA	18,314	Low	1,214	Low	0.30
Bolivia	Candelaria-Corani†	BOL44	5,663	Unprotected	Isiboro-Amboró	0.24		75,345	Low	8,382	Low	0.29
Bolivia	Cerro Azanaques†	BOL58	15,249	Unprotected	-----	0.07		-30,962	Low	338	Low	0.35
Bolivia	Cerro Q'ueñwa Sandora	BOL9	57,875	Unprotected	-----	0.07	IBA	264,309	Low	1,824	Low	0.43
Bolivia	Choquecamiri†	BOL47	8,585	Unprotected	Madidi-Pilón Lajas-Cotapata	0.13		59,133	Low	11,680	Low	0.34
Bolivia	Cochabamba	BOL48	10,268	Partially protected	Isiboro-Amboró	0.09	AZE	50,445	Low	555	Low	0.79
Bolivia	Comarapa	BOL11	5,888	Partially protected	Isiboro-Amboró	0.13	AZE	31,810	Low	1,714	Low	0.26

Country	KBA name	CEPF Code	Area (hectares)	Protection status	Corridor	RBV	Another	Sum of water balance (mm/year)	Water balance classification	Total carbon stored (t C)	Carbon stock classification	IIA *
Bolivia	Cotapata	BOL13	227,549	Unprotected	Madidi-Pilón Lajas-Cotapata	0.16	AZE	2,124,267	Low	492,980	Medium	0.22
Bolivia	Cristal Mayu y alrededores	BOL14	29,440	Unprotected	Isiboro-Amboró	0.22	IBA	808,436	Low	98,012	Low	0.24
Bolivia	Cuenca Cotacajes	BOL15	143,104	Unprotected	Isiboro-Amboró	0.10	IBA AZE	1,813,149	Low	55,852	Low	0.36
Bolivia	Cuencas de Ríos Caine y Mizque	BOL16	339,205	Partially protected	-----	0.05	IBA	1,262,127	Low	26,479	Low	0.21
Bolivia	Culpina	BOL49	5,494	Unprotected	-----	0.05	AZE	16,891	Low	492	Low	0.20
Bolivia	Lago Poopó y Río Laka Jahuira	BOL19	239,129	Protected	Lagos Salinos del Altiplano Chileno/Boliviano	0.06	IBA	-1,063,456	Low	2,922	Low	0.14
Bolivia	Lago Titicaca (Sector Boliviano)	BOL20	368,971	Protected	-----	0.15	IBA AZE	366,089	Low	4,706	Low	0.13
Bolivia	Lagunas de Agua Dulce del Sureste de Potosí	BOL21	310,647	Protected	Puna Trinacional	0.02	IBA	-992,072	Low	9,696	Low	0.09
Bolivia	Lagunas Salinas del Suroeste de Potosí	BOL22	611,736	Protected	Puna Trinacional	0.04	IBA	-1,809,550	Low	20,463	Low	0.14
Bolivia	Mallasa-Taypichullo	BOL51	13,498	Unprotected	-----	0.10		67,665	Low	689	Low	0.51
Bolivia	Pampa Redonda	BOL52	10,163	Unprotected	-----	0.09	AZE	44,512	Low	7,036	Low	0.13
Bolivia	Parque Nacional Sajama	BOL23	97,237	Partially protected	Lagos Salinos del Altiplano Chileno/Boliviano	0.07	IBA	61,749	Low	5,074	Low	0.15
Bolivia	Parque Nacional Torotoro†	BOL53	15,271	Protected	-----	0.07		14,791	Low	164	Low	0.24
Bolivia	Parque Nacional Tuni Condoriri†	BOL46	8,345	Protected	Madidi-Pilón Lajas-Cotapata	0.23		47,978	Low	505	Low	0.36
Bolivia	Parque Nacional y Área Natural de	BOL45	57,238	Protected	Madidi-Pilón Lajas-Cotapata	0.35		490,452	Low	105,740	Low	0.32

Country	KBA name	CEPF Code	Area (hectares)	Protection status	Corridor	RBV	Another	Sum of water balance (mm/year)	Water balance classification	Total carbon stored (t C)	Carbon stock classification	IIA *
	Manejo Integrado Cotapata†											
Bolivia	Quebrada Mojón	BOL24	40,426	Unprotected	Isiboro-Amboró	0.12	IBA	220,151	Low	454	Low	0.17
Bolivia	Reserva Biológica Cordillera de Sama	BOL26	96,224	Protected	Tarija-Jujuy	0.03	IBA	59,931	Low	1,787	Low	0.25
Bolivia	Reserva Nacional de Flora y Fauna Tariquía	BOL27	222,760	Protected	Tarija-Jujuy	0.08	IBA	1,964,018	Low	665,654	Medium	0.10
Bolivia	Río Caballuni	BOL54	697	Unprotected	-----	0.10	AZE	4,174	Low	16	Low	0.45
Bolivia	Río Guadalquivir	BOL50	31,836	Unprotected	Tarija-Jujuy	0.06	AZE	163,003	Low	1,193	Low	0.42
Bolivia	Río Huayllamarca	BOL25	5,209	Unprotected	Lagos Salinos del Altiplano Chileno/Boliviano	0.07	AZE	-15,783	Low	795	Low	0.38
Bolivia	Río San Juan tributario oeste área pre puna	BOL55	16, 283	Partially protected	Tarija-Jujuy	0.01	AZE	8,142	Low	653	Low	0.16
Bolivia	Serranía Bella Vista	BOL29	33,391	Unprotected	Madidi-Pilón Lajas-Cotapata	0.08	IBA	569,674	Low	98,183	Low	0.23
Bolivia	Serranía de Aguaragüe	BOL56	99,979	Protected	Tarija-Jujuy	0.05	IBA	461,305	Low	224,827	Low	0.28
Bolivia	Tacacoma-Quiabaya y Valle de Sorata	BOL30	87,333	Unprotected	Madidi-Pilón Lajas-Cotapata	0.13	IBA	705,856	Low	23,746	Low	0.38
Bolivia	Vertiente Sur del Parque Nacional Tunari	BOL32	128,147	Protected	Isiboro-Amboró	0.13	IBA	803,549	Low	4,271	Low	0.34
Bolivia	Yungas Inferiores de Amboró	BOL33	299,926	Protected	Isiboro-Amboró	0.08	IBA	3,957,440	Medium	925,170	Medium	0.12
Bolivia	Yungas Inferiores de Carrasco	BOL34	425,537	Protected	Isiboro-Amboró	0.15	IBA	11,769,797	High	1,355,900	High	0.14
Bolivia	Yungas Inferiores de Isiboro-Sécure/Altamachi	BOL35	193,812	Protected	Isiboro-Amboró	0.09	IBA	5,725,714	Medium	622,470	Medium	0.02

Country	KBA name	CEPF Code	Area (hectares)	Protection status	Corridor	RBV	Another	Sum of water balance (mm/year)	Water balance classification	Total carbon stored (t C)	Carbon stock classification	IIA *
Bolivia	Yungas Inferiores de Madidi	BOL36	372,951	Protected	Madidi-Pilón Lajas-Cotapata	0.14	IBA	8,236,296	High	1,177,059	High	0.12
Bolivia	Yungas Inferiores de Pilón Lajas	BOL37	249,857	Protected	Madidi-Pilón Lajas-Cotapata	0.12	IBA	3,973,546	Medium	785,277	Medium	0.14
Bolivia	Yungas Superiores de Amboró	BOL38	245,394	Protected	Isiboro-Amboró	0.09	IBA	1,865,588	Low	732,765	Medium	0.09
Bolivia	Yungas Superiores de Apolobamba	BOL39	436,794	Protected	Madidi-Pilón Lajas-Cotapata	0.15	IBA AZE	4,218,395	Medium	498,170	Medium	0.24
Bolivia	Yungas Superiores de Carrasco	BOL40	205,748	Protected	Isiboro-Amboró	0.19	IBA AZE	1,820,565	Low	354,657	Medium	0.16
Bolivia	Yungas Superiores de Madidi	BOL41	240,426	Protected	Madidi-Pilón Lajas-Cotapata	0.14	IBA	4,670,758	Medium	706,217	Medium	0.14
Bolivia	Yungas Superiores de Mosetenes y Cocapata	BOL42	337,229	Partially protected	Isiboro-Amboró	0.12	IBA	7,758,772	High	1,105,345	Medium	0.05
Chile	Laguna del Negro Francisco y Laguna Santa Rosa	CHI12	54,693	Partially protected	-----	0.029	IBA	-127,035	Low	380	Low	0.13
Chile	Lagunas Bravas	CHI1	804	Unprotected	-----	0.011	IBA	-1,542	Low	0	Low	0.03
Chile	Monumento Natural Salar de Surire	CHI2	15,814	Protected	Lagos Salinos del Altiplano Chileno/Boliviano	0.021	IBA	960	Low	242	Low	0.42
Chile	Murmuntani	CHI13	13,539	Unprotected	-----	0.046	AZE	-52,436	Low	1,604	Low	0.17
Chile	Parque Nacional Lauca	CHI3	127,977	Protected	Lagos Salinos del Altiplano Chileno/Boliviano	0.027	IBA	3,620	Low	6,116	Low	0.19
Chile	Parque Nacional Salar de Huasco	CHI4	108,221	Unprotected	Lagos Salinos del Altiplano Chileno/Boliviano	0.033	IBA	-322,902	Low	4,173	Low	0.15

Country	KBA name	CEPF Code	Area (hectares)	Protection status	Corridor	RBV	Another	Sum of water balance (mm/year)	Water balance classification	Total carbon stored (t C)	Carbon stock classification	IIA *
Chile	Parque Nacional Volcán Isluga	CHI5	153,662	Protected	Lagos Salinos del Altiplano Chileno/Boliviano	0.024	IBA	-244,037	Low	9,632	Low	0.30
Chile	Precordillera Socoroma-Putre	CHI6	5,848	Unprotected	Lagos Salinos del Altiplano Chileno/Boliviano	0.026	IBA	-4,363	Low	354	Low	0.46
Chile	Reserva Nacional Los Flamencos-Soncor	CHI10	66,430	Protected	Puna Trinacional	0.024	IBA	-234,431	Low	1,162	Low	0.11
Chile	Río Vilama	CHI14	27,808	Unprotected	Puna Trinacional	0.06	AZE	-114,789	Low	1,689	Low	0.11
Chile	Salar de Piedra Parada	CHI11	2,715	Unprotected	-----	0.013	IBA	-2,405	Low	110	Low	0.03
Chile	Zapahuira	CHI15	9,482	Unprotected	Lagos Salinos del Altiplano Chileno/Boliviano	0.08	AZE	-36,963	Low	632	Low	0.11
Colombia	9 km sur de Valdivia	COL1	8,175	Partially protected	Sonsón-Nechi	0.28	AZE	265,028	Low	12,965	Low	0.36
Colombia	Agua de la Virgen	COL2	122	Unprotected	-----	0.24	IBA	1,227	Low	70	Low	0.45
Colombia	Alto de Pisones	COL5	1,380	Not protected	Paraguas-Munchique-Bosques Montanos del Sur de Antioquia	0.44	IBA	31,388	Low	4,649	Low	0.10
Colombia	Alto Quindío	COL6	4,582	Protected	Noreste de Quindío	0.53	IBA	73,187	Low	7,513	Low	0.25
Colombia	Bosque de San Antonio/Km 18	COL7	5,993	Partially protected	Paraguas-Munchique-Bosques Montanos del Sur de Antioquia	0.42	IBA	87,956	Low	5,235	Low	0.49
Colombia	Bosques de la Falla del Tequendama	COL8	12,598	Protected	-----	0.31	IBA	112,117	Low	5,447	Low	0.52

Country	KBA name	CEPF Code	Area (hectares)	Protection status	Corridor	RBV	Another	Sum of water balance (mm/year)	Water balance classification	Total carbon stored (t C)	Carbon stock classification	IIA *
Colombia	Bosques de Tolemaida, Piscilago y alrededores	COL9	22,758	Unprotected	-----	0.19	IBA	326,976	Low	14,388	Low	0.54
Colombia	Bosques del Oriente de Risaralda	COL10	27,610	Protected	Noreste de Quindío	0.46	IBA	572,623	Low	27,693	Low	0.11
Colombia	Bosques Montanos del Sur de Antioquia	COL11	200,574	Partially protected	Paraguas-Munchique-Bosques Montanos del Sur de Antioquia	0.24	IBA	5,574,189	Medium	381,081	Medium	0.25
Colombia	Bosques Secos del Valle del Río Chicamocha	COL12	395,012	Partially protected	Norte de la Cordillera Oriental	0.23	IBA	5,318,568	Medium	165,553	Low	0.41
Colombia	Cafetales de Támesis	COL18	263	Unprotected	Paraguas-Munchique-Bosques Montanos del Sur de Antioquia	0.22	IBA	4,751	Low	400	Low	0.37
Colombia	Cañón del Río Alicante	COL13	3,271	Partially protected	Sonsón-Nechi	0.29	IBA	67,597	Low	5,766	Low	0.27
Colombia	Cañón del Río Barbas y Bremen	COL14	11,193	Protected	Noreste de Quindío	0.42	IBA	282,620	Low	17,399	Low	0.49
Colombia	Cañón del Río Combeima	COL15	7,588	Unprotected	Noreste de Quindío	0.45	IBA	148,604	Low	10,836	Low	0.45
Colombia	Cañón del Río Guatiquía	COL16	34,913	Partially protected	Cordillera Oriental-Bogotá	0.29	IBA AZE	1,479,064	Low	50,380	Low	0.23
Colombia	Caparrapi†	COL123	4,117	Unprotected	-----	0.15		101,224	Low	4,658	Low	0.55
Colombia	Carretera Ramiriqui-Zetaquira	COL19	10,433	Partially protected	-----	0.23	AZE	87,629	Low	7,497	Low	0.46
Colombia	Cerro de Pan de Azúcar	COL20	33,010	Protected	Sonsón-Nechi	0.29	AZE	600,847	Low	50,987	Low	0.43
Colombia	Cerro La Judía	COL21	10,221	Partially protected	Norte de la Cordillera Oriental	0.38	IBA	96,789	Low	17,754	Low	0.44

Country	KBA name	CEPF Code	Area (hectares)	Protection status	Corridor	RBV	Another	Sum of water balance (mm/year)	Water balance classification	Total carbon stored (t C)	Carbon stock classification	IIA *
Colombia	Cerro Pintado (Serranía de Perijá)	COL22	11,878	Protected	Cordillera de Perijá	0.41	IBA AZE	180,691	Low	30,354	Low	0.18
Colombia	Cerros Occidentales de Tabio y Tenjo	COL23	472	Unprotected	-----	0.27	IBA	3,450	Low	432	Low	0.63
Colombia	Complejo Lacustre de Fúquene, Cucunubá y Palacio	COL25	22,248	Protected	-----	0.21	IBA	172,159	Low	10,982	Low	0.46
Colombia	Corredor Pisba-Cocuy†	COL124	17,700	Unprotected	Norte de la Cordillera Oriental	0.24		187,061	Low	23,346	Low	0.28
Colombia	Cuchilla de San Lorenzo	COL28	71,600	Protected	Sierra Nevada de Santa Marta y alrededores	0.37	IBA	1,344,055	Low	143,990	Low	0.15
Colombia	Cuenca del Río Hereje	COL29	8,258	Protected	Cordillera Central	0.20	IBA	164,732	Low	10,330	Low	0.03
Colombia	Cuenca del Río Jiménez	COL30	10,465	Unprotected	Noreste de Quindío	0.20	IBA	205,671	Low	11,007	Low	0.62
Colombia	Cuenca del Río San Miguel	COL31	8,882	Protected	Cordillera Central	0.18	IBA	195,638	Low	19,289	Low	0.24
Colombia	Cuenca del Río Toche	COL32	24,477	Partially protected	Noreste de Quindío	0.50	IBA	443,070	Low	28,905	Low	0.34
Colombia	Cuenca Hidrográfica del Río San Francisco y sus alrededores	COL33	5,560	Partially protected	-----	0.23		113,212	Low	6,777	Low	0.66
Colombia	Embalse de Punchiná y su zona de protección	COL34	5,068	Protected	Sonsón-Nechi	0.27	IBA	123,073	Low	12,007	Low	0.20
Colombia	Embalse de San Lorenzo y Jaguas	COL35	6,033	Protected	Sonsón-Nechi	0.28	IBA	166,788	Low	10,891	Low	0.24
Colombia	Enclave Seco del Río Dagua	COL36	8,509	Partially protected	Paraguas-Munchique-Bosques Montanos del Sur de Antioquia	0.38	IBA AZE	109,212	Low	3,235	Low	0.62
Colombia	Finca la Betulia Reserva la Patasola	COL37	1,481	Protected	Noreste de Quindío	0.53	IBA	28,976	Low	3,834	Low	0.18

Country	KBA name	CEPF Code	Area (hectares)	Protection status	Corridor	RBV	Another	Sum of water balance (mm/year)	Water balance classification	Total carbon stored (t C)	Carbon stock classification	IIA *
Colombia	Finca Paraguay	COL38	12,876	Partially protected	Noreste de Quindío	0.37	IBA	257,613	Low	1,453	Low	0.09
Colombia	Fusagasuga	COL39	9,198	Unprotected	-----	0.31	AZE	73,197	Low	757	Low	0.44
Colombia	Gravilleras del Valle del Río Siecha	COL41	2,274	Unprotected	-----	0.26	IBA	17,150	Low	90	Low	0.64
Colombia	Guerrero, Guargua y Laguna Verde†	COL125	57,326	Protected	-----	0.25		518,869	Low	23,639	Low	0.40
Colombia	Hacienda La Victoria, Cordillera Oriental	COL42	13,266	Unprotected	-----	0.25	AZE	242,163	Low	12,719	Low	0.50
Colombia	Haciendas Ganaderas del Norte del Cauca	COL43	1,394	Unprotected	-----	0.10	IBA	26,661	Low	644	Low	0.43
Colombia	Humedales de la Sabana de Bogotá	COL44	20,682	Unprotected	-----	0.28	IBA	99,073	Low	6,029	Low	0.39
Colombia	La Empalada	COL45	10,560	Partially protected	Paraguas-Munchique-Bosques Montanos del Sur de Antioquia	0.31	AZE	225,651	Low	21,284	Low	0.34
Colombia	La Forzosa-Santa Gertrudis	COL46	4,106	Partially protected	Sonsón-Nechi	0.34	IBA	112,625	Low	11,845	Low	0.20
Colombia	La Salina	COL47	8,956	Unprotected	Norte de la Cordillera Oriental	0.19		328,541	Low	19,677	Low	0.06
Colombia	La Victoria (Caldas)	COL48	767	Partially protected	Sonsón-Nechi	0.34	IBA	25,723	Low	1,535	Low	0.37
Colombia	La Victoria (Nariño)	COL122	1,111	Unprotected	La Victoria-La Cocha-Sibundoy	0.40	AZE	13,330	Low	1,025	Low	0.62
Colombia	Lago Cumbal	COL49	371	Unprotected	-----	0.13	IBA	3,559	Low	26	Low	0.29
Colombia	Laguna de la Cocha	COL50	63,270	Partially protected	La Victoria-La Cocha-Sibundoy	0.34	IBA	1,199,958	Low	91,565	Low	0.28
Colombia	Laguna de Tota	COL51	6,263	Unprotected	-----	0.25	IBA	44,280	Low	34	Low	0.32

Country	KBA name	CEPF Code	Area (hectares)	Protection status	Corridor	RBV	Another	Sum of water balance (mm/year)	Water balance classification	Total carbon stored (t C)	Carbon stock classification	IIA *
Colombia	Lagunas Bombona y Vancouver	COL52	7,308	Partially protected	Noreste de Quindío	0.35	IBA	125,410	Low	3,146	Low	0.36
Colombia	Mejue†	COL126	12,805	Protected	Andes Venezolanos	0.37		99,288	Low	23,528	Low	0.38
Colombia	Municipio de Pandi	COL55	3,289	Unprotected	-----	0.25	AZE	45,150	Low	4,452	Low	0.51
Colombia	Orquídeas-Musinga-Carauta	COL56	94,396	Partially protected	-----	0.32	AZE	2,400,568	Medium	190,281	Low	0.22
Colombia	Paraíso de Aves del Tabor y Magdalena	COL127	92,356	Partially protected	-----	0.21	IBA	1,148,082	Low	86,125	Low	0.48
Colombia	Páramo de Belmira-Santa Inés y bosques asociados†	COL128	50,480	Protected	-----	0.23		1,161,978	Low	72,669	Low	0.22
Colombia	Páramo de Sonsón	COL57	73,041	Partially protected	Sonsón-Nechi	0.32	AZE	1,597,912	Low	91,216	Low	0.30
Colombia	Páramo del Almorzadero†	COL129	54,079	Unprotected	Norte de la Cordillera Oriental	0.28		664,341	Low	9,668	Low	0.35
Colombia	Páramo Tierra Negra†	COL130	6,060	Unprotected	-----	0.38		50,605	Low	6,847	Low	0.45
Colombia	Páramo Urrao	COL58	35,295	Protected	-----	0.32	AZE	866,658	Low	77,474	Low	0.16
Colombia	Páramos del Sur de Antioquia	COL59	14,093	Protected	Sonsón-Nechi	0.37	IBA	258,849	Low	38,673	Low	0.23
Colombia	Páramos y Bosques Altoandinos de Génova	COL60	12,549	Partially protected	Noreste de Quindío	0.36	IBA	175,864	Low	13,479	Low	0.19
Colombia	Parque Nacional Natural Chingaza y alrededores	COL61	88,443	Protected	Cordillera Oriental-Bogotá	0.30	IBA AZE	2,074,183	Low	105,904	Low	0.07
Colombia	Parque Nacional Natural Cordillera de los Picachos	COL26	319,864	Protected	-----	0.19	AZE	6,098,825	Medium	778,875	Medium	0.02
Colombia	Parque Nacional Natural Cueva de los Guácharos	COL62	7,773	Protected	-----	0.39	IBA	197,809	Low	12,134	Low	0.02

Country	KBA name	CEPF Code	Area (hectares)	Protection status	Corridor	RBV	Another	Sum of water balance (mm/year)	Water balance classification	Total carbon stored (t C)	Carbon stock classification	IIA *
Colombia	Parque Nacional Natural de Pisba	COL63	58,139	Partially protected	Norte de la Cordillera Oriental	0.25	IBA	792,244	Low	51,378	Low	0.22
Colombia	Parque Nacional Natural El Cocuy	COL64	362,163	Protected	Norte de la Cordillera Oriental	0.17	IBA	6,840,749	Medium	365,002	Medium	0.04
Colombia	Parque Nacional Natural Farallones de Cali	COL65	220,153	Protected	Paraguas-Munchique-Bosques Montanos del Sur de Antioquia	0.35	IBA AZE	6,170,737	Medium	337,802	Medium	0.14
Colombia	Parque Nacional Natural Las Orquídeas	COL66	35,070	Protected	-----	0.34	IBA	17,886	Low	2,687	Low	0.17
Colombia	Parque Nacional Natural Munchique y extensión sur	COL67	52,490	Protected	Paraguas-Munchique-Bosques Montanos del Sur de Antioquia	0.38	IBA AZE	2,039,214	Low	123,522	Low	0.12
Colombia	Parque Nacional Natural Nevado del Huila	COL68	182,382	Protected	Cordillera Central	0.22	IBA	3,387,359	Medium	252,458	Low	0.06
Colombia	Parque Nacional Natural Paramillo	COL69	607,205	Protected	-----	0.20	IBA	14,952,296	High	1,547,740	High	0.10
Colombia	Parque Nacional Natural Puracé	COL70	82,653	Protected	Cordillera Central	0.30	IBA AZE	1,514,802	Low	99,854	Low	0.13
Colombia	Parque Nacional Natural Sierra de la Macarena	COL71	687,470	Protected	-----	0.21	IBA	15,653,125	High	1,567,147	High	0.05
Colombia	Parque Nacional Natural Sumapaz	COL72	250,646	Protected	Cordillera Oriental-Bogotá	0.20	IBA	4,647,111	Medium	246,267	Low	0.05
Colombia	Parque Nacional Natural Tamá	COL73	61,128	Protected	Andes Venezolanos	0.28	IBA	1,553,202	Low	102,494	Low	0.08
Colombia	Parque Nacional Natural Tatamá	COL74	59,414	Partially protected	Paraguas-Munchique-	0.34	IBA	1,538,914	Low	104,036	Low	0.07

Country	KBA name	CEPF Code	Area (hectares)	Protection status	Corridor	RBV	Another	Sum of water balance (mm/year)	Water balance classification	Total carbon stored (t C)	Carbon stock classification	IIA *
					Bosques Montanos del Sur de Antioquia							
Colombia	Parque Natural Nacional Sierra Nevada de Santa Marta y sus alrededores	COL110	517,667	Protected	Sierra Nevada de Santa Marta y alrededores	0.30	AZE	8,788,988	High	554,760	Medium	0.08
Colombia	Parque Natural Regional Cortadera†	COL131	19,169	Protected	-----	0.20		152,907	Low	7,262	Low	0.31
Colombia	Parque Natural Regional Páramo del Duende	COL75	32,136	Partially protected	Paraguas-Munchique-Bosques Montanos del Sur de Antioquia	0.28	IBA	504,728	Low	22,779	Low	0.06
Colombia	Parque Natural Regional Santurbán-Salazar de las Palmas†	COL132	23,082	Protected	-----	0.26		221,446	Low	44,950	Low	0.12
Colombia	Parque Natural Regional Serranía del Perijá†	COL133	29,471	Protected	Cordillera de Perijá	0.44		424,956	Low	21,222	Low	0.12
Colombia	Parque Natural Regional y Reserva Forestal Protectora Regional Páramo de Rabanal†	COL134	8,249	Protected	-----	0.25		69,021	Low	2,054	Low	0.47
Colombia	Pueblo Bello	COL76	1,269	Protected	Sierra Nevada de Santa Marta y alrededores	0.22	IBA	21,064	Low	1,753	Low	0.33
Colombia	Refugio Río Claro	COL79	526	Partially protected	-----	0.22	IBA	11,362	Low	722	Low	0.36
Colombia	Región del Alto Calima	COL80	21,917	Partially protected	Paraguas-Munchique-Bosques	0.35	IBA	378,225	Low	19,309	Low	0.13

Country	KBA name	CEPF Code	Area (hectares)	Protection status	Corridor	RBV	Another	Sum of water balance (mm/year)	Water balance classification	Total carbon stored (t C)	Carbon stock classification	IIA *
					Montanos del Sur de Antioquia							
Colombia	Reserva Biológica Cachalú	COL81	1,195	Protected	Norte de la Cordillera Oriental	0.44	IBA	17,803	Low	4,083	Low	0.09
Colombia	Reserva El Oso	COL82	4,997	Protected	Cordillera Central	0.30	IBA	80,727	Low	8,745	Low	0.02
Colombia	Reserva Forestal Protectora Nacional Río Algodonal†	COL135	9,717	Protected	-----	0.30		100,896	Low	9,048	Low	0.20
Colombia	Reserva Forestal Yotoco	COL83	508	Protected	Paraguas-Munchique-Bosques Montanos del Sur de Antioquia	0.30	IBA	6,354	Low	433	Low	0.78
Colombia	Reserva Hidrográfica, Forestal y Parque Ecológico de Río Blanco	COL84	4,347	Protected	Noreste de Quindío	0.45	IBA	85,877	Low	2,654	Low	0.36
Colombia	Reserva Natural Cajibío	COL85	347	Unprotected	-----	0.14	IBA	6,193	Low	133	Low	0.37
Colombia	Reserva Natural El Pangán	COL86	7,726	Not protected	Awá-Cotacachi-Illinizas	0.34	IBA	295,445	Low	7,037	Low	0.18
Colombia	Reserva Natural Ibanasca	COL87	2,393	Protected	Noreste de Quindío	0.50	IBA	49,547	Low	2,421	Low	0.15
Colombia	Reserva Natural La Planada	COL88	4,519	Protected	Awá-Cotacachi-Illinizas	0.42	IBA AZE	84,715	Low	11,153	Low	0.21
Colombia	Reserva Natural Laguna de Sonso	COL89	926	Protected	-----	0.14	IBA	7,898	Low	330	Low	0.72
Colombia	Reserva Natural Meremberg	COL90	2,167	Protected	Cordillera Central	0.30	IBA	45,364	Low	2,318	Low	0.36
Colombia	Reserva Natural Río Ñambí	COL91	8,595	Partially protected	Awá-Cotacachi-Illinizas	0.37	IBA	382,349	Low	11,284	Low	0.28

Country	KBA name	CEPF Code	Area (hectares)	Protection status	Corridor	RBV	Another	Sum of water balance (mm/year)	Water balance classification	Total carbon stored (t C)	Carbon stock classification	IIA *
Colombia	Reserva Natural Semillas de Agua	COL92	1,270	Protected	Noreste de Quindío	0.41	IBA	16,563	Low	493	Low	0.31
Colombia	Reserva Natural Tambito	COL93	124	Not protected	Paraguas-Munchique-Bosques Montanos del Sur de Antioquia	0.33	IBA	2,786	Low	242	Low	0.25
Colombia	Reserva Regional Bajo Cauca Nechí	COL94	142,495	Unprotected	Sonsón-Nechi	0.19	IBA	5,130,382	Medium	351,186	Medium	0.27
Colombia	Reservas Comunitarias de Roncesvalles	COL95	41,373	Partially protected	Noreste de Quindío	0.33	IBA	506,651	Low	35,297	Low	0.12
Colombia	Rocas de Suesca†	COL136	885	Unprotected	-----	0.28		5,649	Low	0	Low	0.79
Colombia	San Sebastián	COL97	6,674	Protected	Sonsón-Nechi	0.38	IBA	126,317	Low	15,291	Low	0.21
Colombia	Santuario de Fauna y Flora Galeras	COL99	9,020	Protected	-----	0.22	IBA AZE	147,831	Low	9,612	Low	0.34
Colombia	Santurbán-Sisavita-Mutiscua†‡	COL138	39,737	Protected	-----	0.35		NA	NA	NA	NA	NA
Colombia	Selva de Florencia	COL101	29,506	Partially protected	Sonsón-Nechi	0.43	IBA AZE	1,012,843	Low	63,069	Low	0.40
Colombia	Serranía de las Minas	COL103	109,935	Protected	Cordillera Central	0.28	IBA	1,970,778	Low	196,309	Low	0.28
Colombia	Serranía de las Quinchas	COL104	100,785	Partially protected	-----	0.15	IBA	2,408,221	Medium	225,955	Low	0.27
Colombia	Serranía de los Churumbelos	COL105	105,496	Protected	-----	0.29	IBA	3,336,614	Medium	317,554	Medium	0.02
Colombia	Serranía de los Paraguas	COL106	259,592	Partially protected	Paraguas-Munchique-Bosques Montanos del Sur de Antioquia	0.29	IBA	7,906,966	High	431,160	Medium	0.13
Colombia	Serranía de los Yariguíes	COL102	288,265	Protected	Norte de la Cordillera Oriental	0.22	IBA AZE	5,074,726	Medium	476,733	Medium	0.23

Country	KBA name	CEPF Code	Area (hectares)	Protection status	Corridor	RBV	Another	Sum of water balance (mm/year)	Water balance classification	Total carbon stored (t C)	Carbon stock classification	IIA *
Colombia	Serranía de San Lucas	COL108	816,648	Not protected	-----	0.18	IBA	20,696,453	High	2,060,162	High	0.26
Colombia	Serranía del Pinche	COL109	4,870	Partially protected	Paraguas-Munchique-Bosques Montanos del Sur de Antioquia	0.27	IBA AZE	124,185	Low	12,447	Low	0.12
Colombia	Soatá	COL111	1,173	Unprotected	Norte de la Cordillera Oriental	0.25	IBA	12,484	Low	1,113	Low	0.38
Colombia	Unidad Biogeográfica de Siscunci Oceta†	COL137	57, 912	Protected	Norte de la Cordillera Oriental	0.25		672,391	Low	11,620	Low	0.28
Colombia	Valle de San Salvador	COL113	76,833	Protected	Sierra Nevada de Santa Marta y alrededores	0.30	IBA	1,331,046	Low	126,696	Low	0.14
Colombia	Valle de Sibundoy y Laguna de la Cocha	COL115	165,094	Partially protected	La Victoria-La Cocha-Sibundoy	0.32		4,018,480	Medium	233,228	Low	0.08
Colombia	Valle del Río Frío	COL116	47,995	Partially protected	Sierra Nevada de Santa Marta y alrededores	0.32	IBA	584,785	Low	76,809	Low	0.18
Colombia	Vereda el Llano	COL117	3,306	Unprotected	Noreste de Quindío	0.36		76,201	Low	5,391	Low	0.62
Colombia	Vereda Las Minas y alrededores	COL119	165,046	Protected	Norte de la Cordillera Oriental	0.31	IBA AZE	2,145,372	Low	279,820	Low	0.18
Colombia	Villavicencio	COL120	3,770	Unprotected	Cordillera Oriental-Bogotá	0.19	AZE	143,787	Low	4,431	Low	0.82
Ecuador	1 km oeste de Loja	ECU1	672	Protected	Sangay Podocarpus	0.33	AZE	7,442	Low	24	Low	0.71
Ecuador	Abra de Zamora†	ECU2	7,833	Protected	Sangay Podocarpus	0.38		94,641	Low	16,526	Low	0.40

Country	KBA name	CEPF Code	Area (hectares)	Protection status	Corridor	RBV	Another	Sum of water balance (mm/year)	Water balance classification	Total carbon stored (t C)	Carbon stock classification	IIA *
Ecuador	Acanamá-Guashapamba-Aguirre	ECU3	1,994	Partially protected	Sangay Podocarpus	0.26	IBA	11,559	Low	566	Low	0.62
Ecuador	Agua Rica	ECU4	806	Unprotected	-----	0.445	AZE	25,588	Low	1,776	Low	0.87
Ecuador	Alamor-Celica	ECU5	6,529	Protected	Bosques Secos de Tumbes-Loja	0.256	IBA	102,820	Low	3,341	Low	0.38
Ecuador	Alrededores de Amaluza	ECU6	109,051	Partially protected	Sangay Podocarpus	0.30		1,633,594	Low	176,304	Low	0.25
Ecuador	Bosque Protector Alto Nangaritza	ECU9	113,295	Protected	Cóndor-Kutukú-Palanda	0.261	IBA	2,393,873	Medium	353,339	Medium	0.29
Ecuador	Bosque Protector Cashca Totoras	ECU10	6,623	Unprotected	-----	0.156	IBA AZE	48,801	Low	4,891	Low	0.22
Ecuador	Bosque Protector Colambo-Yacuri	ECU11	63,755	Protected	Cóndor-Kutukú-Palanda	0.159	IBA	543,607	Low	84,549	Low	0.22
Ecuador	Bosque Protector Dudas-Mazar	ECU12	54,357	Partially protected	Cotopaxi-Amaluza	0.211	IBA	500,087	Low	25,373	Low	0.46
Ecuador	Bosque Protector Jatumpamba-Jorupe	ECU13	8,111	Protected	Bosques Secos de Tumbes-Loja	0.207	IBA	75,586	Low	8,102	Low	0.59
Ecuador	Bosque Protector Los Cedros	ECU14	5,619	Unprotected	Awá-Cotacachi-Illinizas	0.457	IBA	155,920	Low	13,177	Low	0.29
Ecuador	Bosque Protector Molleturo Mullopungo	ECU15	99,963	Protected	Oeste de Azuay	0.228	IBA	1,012,990	Low	98,398	Low	0.38
Ecuador	Bosque Protector Moya-Molón	ECU16	12,376	Unprotected	Sangay Podocarpus	0.25	IBA	134,005	Low	10,663	Low	0.31
Ecuador	Bosque Protector Puyango	ECU17	2,713	Protected	Bosques Secos de Tumbes-Loja	0.24	IBA	29,888	Low	1,234	Low	0.26
Ecuador	Bosque y Vegetación Protector El Chorro†	ECU80	4,913	Protected	Oeste de Azuay	0.211		34,522	Low	2,136	Low	0.44
Ecuador	Cajas-Mazán	ECU20	31,681	Protected	Oeste de Azuay	0.193	IBA	259,867	Low	7,013	Low	0.27

Country	KBA name	CEPF Code	Area (hectares)	Protection status	Corridor	RBV	Another	Sum of water balance (mm/year)	Water balance classification	Total carbon stored (t C)	Carbon stock classification	IIA *
Ecuador	Cañón del río Catamayo	ECU18	27,634	Protected	Bosques Secos de Tumbes-Loja	0.192	IBA	200,749	Low	26,314	Low	0.42
Ecuador	Catacocha	ECU21	3,737	Protected	Bosques Secos de Tumbes-Loja	0.229	IBA	43,542	Low	956	Low	0.59
Ecuador	Cayapas-Santiago-Wimbí	ECU81	66,584	Partially protected	Awá-Cotacachi-Illinizas	0.37	IBA	1,750,211	Low	150,564	Low	0.09
Ecuador	Cazaderos-Mangaurquillo	ECU23	51,005	Protected	Bosques Secos de Tumbes-Loja	0.165	IBA	209,730	Low	39,990	Low	0.14
Ecuador	Cerro de Hayas-Naranjal	ECU24	2,655	Protected	Oeste de Azuay	0.257	IBA	30,576	Low	2,388	Low	0.24
Ecuador	Chilla†	ECU82	28,591	Partially protected	-----	0.221		237,493	Low	17,698	Low	0.41
Ecuador	Conchay†	ECU83	32,055	Unprotected	Cóndor-Kutukú-Palanda	0.331		967,801	Low	88,696	Low	0.47
Ecuador	Cordillera de Huacamayos-San Isidro-Sierra Azul	ECU25	69,671	Protected	Corredor Nororiental	0.51	IBA	2,223,776	Medium	156,125	Low	0.11
Ecuador	Cordillera de Kutukú	ECU26	191,035	Unprotected	Cóndor-Kutukú-Palanda	0.273	IBA AZE	6,581,504	Medium	601,587	Medium	0.29
Ecuador	Cordillera del Cóndor	ECU27	257,017	Partially protected	Cóndor-Kutukú-Palanda	0.251	IBA	43,908,617	Very High	5,601,384	Very High	0.35
Ecuador	Corredor Awacachi	ECU28	16,668	Partially protected	Awá-Cotacachi-Illinizas	0.487	IBA	494,821	Low	22,390	Low	0.41
Ecuador	Corredor Ecológico Llanganates-Sangay	ECU29	46,364	Not protected	Cotopaxi-Amaluza	0.35	IBA	1,349,595	Low	134,103	Low	0.37
Ecuador	Daucay	ECU84	1,345	Unprotected	-----	0.228	IBA	9,120	Low	1,894	Low	0.39
Ecuador	El Ángel-Cerro Golondrinas y alrededores	ECU31	49,227	Protected	Awá-Cotacachi-Illinizas	0.25	IBA AZE	540,386	Low	64,447	Low	0.29

Country	KBA name	CEPF Code	Area (hectares)	Protection status	Corridor	RBV	Another	Sum of water balance (mm/year)	Water balance classific ation	Total carbon stored (t C)	Carbon stock classifi cation	IIA *
Ecuador	El Sauce†	ECU85	3,679	Protected	Bosques Secos de Tumbes-Loja	0.235		32,223	Low	2,467	Low	0.26
Ecuador	Estación Biológica Guandera-Cerro Mongus	ECU32	13,094	Protected	-----	0.255	IBA	146,998	Low	14,566	Low	0.21
Ecuador	Gualaceo-Limón Indanza†	ECU86	20,315	Partially protected	Sangay Podocarpus	0.27		208,103	Low	9,270	Low	0.35
Ecuador	Guanujo†	ECU87	11,558	Unprotected	-----	0.186		101,980	Low	4,239	Low	0.46
Ecuador	Guaranda, Gallo Rumi	ECU33	1,866	Unprotected	-----	0.196	AZE	16,789	Low	28	Low	0.82
Ecuador	Intag-Toisán	ECU34	63,884	Unprotected	Awá-Cotacachi-Illinizas	0.417	IBA	986,053	Low	117,39 8	Low	0.32
Ecuador	La Bonita-Santa Bárbara	ECU35	13,060	Protected	-----	0.317	IBA AZE	178,697	Low	26,484	Low	0.47
Ecuador	La Tagua	ECU36	6,624	Protected	Bosques Secos de Tumbes-Loja	0.232	IBA	59,473	Low	8,105	Low	0.15
Ecuador	Lago de Colta	ECU37	288	Unprotected	-----	0.108	IBA	2,978	Low	0	Low	0.78
Ecuador	Las Guardias	ECU39	6,065	Unprotected	-----	0.191		60,279	Low	8,869	Low	0.20
Ecuador	Los Bancos-Milpe	ECU41	3,316	Protected	Awá-Cotacachi-Illinizas	0.478	IBA	101,470	Low	6,284	Low	0.50
Ecuador	Manteles-El Triunfo-Sucre	ECU88	10,735	Unprotected	Cotopaxi-Amaluza	0.205	IBA	98,972	Low	15,333	Low	0.34
Ecuador	Maquipucuna-Río Guayllabamba	ECU43	21,069	Protected	Awá-Cotacachi-Illinizas	0.577	IBA	338,057	Low	57,054	Low	0.40
Ecuador	Mashpi-Pachijal	ECU89	39,525	Protected	Awá-Cotacachi-Illinizas	0.524	IBA	1,018,918	Low	82,137	Low	0.47
Ecuador	Mindo y estribaciones occidentales del volcán Pichincha	ECU44	94,710	Protected	Awá-Cotacachi-Illinizas	0.645	IBA AZE	1,638,325	Low	247,57 5	Low	0.33

Country	KBA name	CEPF Code	Area (hectares)	Protection status	Corridor	RBV	Another	Sum of water balance (mm/year)	Water balance classification	Total carbon stored (t C)	Carbon stock classification	IIA *
Ecuador	Mitad del Mundo†	ECU45	1,289	Protected	Awá-Cotacachi-Illinizas	0.348		9,867	Low	100	Low	0.62
Ecuador	Montañas de Zapote-Najda	ECU47	9,699	Partially protected	Sangay Podocarpus	0.28	IBA	114,663	Low	11,419	Low	0.14
Ecuador	Oeste del Páramo de Apagua	ECU76	1,859	Unprotected	Awá-Cotacachi-Illinizas	0.229	AZE	12,252	Low	133	Low	0.63
Ecuador	Palanda	ECU90	9,456	Protected	Cóndor-Kutukú-Palanda	0.199	IBA	161,497	Low	22,067	Low	0.57
Ecuador	Parque Nacional Cayambe-Coca	ECU59	433,412	Protected	Corredor Nororiental	0.32	IBA AZE	7,566,883	High	705,544	Medium	0.16
Ecuador	Parque Nacional Cotopaxi	ECU48	34,437	Protected	Cotopaxi-Amaluza	0.169	IBA	308,660	Low	3,290	Low	0.09
Ecuador	Parque Nacional Llanganates	ECU49	230,225	Protected	Cotopaxi-Amaluza	0.277	IBA	3,341,403	Medium	271,497	Low	0.08
Ecuador	Parque Nacional Podocarpus	ECU50	142,945	Protected	Sangay Podocarpus	0.3	IBA AZE	1,934,293	Low	338,885	Medium	0.15
Ecuador	Parque Nacional Sangay	ECU51	523,632	Protected	Cotopaxi-Amaluza	0.25	IBA	8,906,284	High	693,317	Medium	0.11
Ecuador	Parque Nacional Sumaco-Napo Galeras	ECU52	217,629	Protected	Corredor Nororiental	0.40	IBA AZE	7,554,637	High	532,106	Medium	0.06
Ecuador	Pilaló	ECU53	335	Unprotected	Awá-Cotacachi-Illinizas	0.354	AZE	4,818	Low	365	Low	0.75
Ecuador	Refugio de Vida Silvestre Pasochoa	ECU55	701	Partially protected	-----	0.254	IBA	7,684	Low	1,345	Low	0.26
Ecuador	Reserva Buenaventura	ECU56	2,209	Unprotected	-----	0.329	IBA	36,634	Low	3,590	Low	0.56
Ecuador	Reserva Comunal Bosque de Angashcola	ECU57	1,944	Protected	Cóndor-Kutukú-Palanda	0.191	IBA	20,931	Low	3,686	Low	0.15
Ecuador	Reserva Ecológica Antisana (oeste) y alrededores	ECU7	113,908	Protected	Corredor Nororiental	0.33	IBA AZE	1,513,550	Low	101,150	Low	0.15

Country	KBA name	CEPF Code	Area (hectares)	Protection status	Corridor	RBV	Another	Sum of water balance (mm/year)	Water balance classification	Total carbon stored (t C)	Carbon stock classification	IIA *
Ecuador	Reserva Ecológica Cofán-Bermejo	ECU60	56,091	Protected	-----	0.26	IBA	1,582,204	Low	151,975	Low	0.17
Ecuador	Reserva Ecológica Cotacachi-Cayapas	ECU61	361,614	Partially protected	Awá-Cotacachi-Illinizas	0.401	IBA	8,238,629	High	562,106	Medium	0.18
Ecuador	Reserva Ecológica Los Illinizas y alrededores	ECU42	169,316	Protected	Awá-Cotacachi-Illinizas	0.318	IBA AZE	2,922,539	Medium	317,468	Medium	0.27
Ecuador	Reserva Natural Tumbesia-La Ceiba-Zapotillo	ECU63	19,377	Protected	Bosques Secos de Tumbes-Loja	0.113	IBA	-24,827	Low	9,619	Low	0.16
Ecuador	Reserva Tapichalaca	ECU64	3,925	Protected	Cóndor-Kutukú-Palanda	0.262	IBA	41,030	Low	7,936	Low	0.27
Ecuador	Reserva Yunguilla	ECU65	182	Protected	Oeste de Azuay	0.229	IBA AZE	986	Low	105	Low	0.68
Ecuador	Río Caoní	ECU54	9,101	Unprotected	Awá-Cotacachi-Illinizas	0.346	IBA	375,529	Low	12,066	Low	0.41
Ecuador	Río Jubones†	ECU91	23,614	Partially protected	-----	0.244		209,597	Low	3,137	Low	0.61
Ecuador	Río León†	ECU92	6,564	Unprotected	Sangay Podocarpus	0.30		39,875	Low	1,171	Low	0.63
Ecuador	Río Toachi-Chiriboga	ECU66	71,187	Unprotected	Awá-Cotacachi-Illinizas	0.579	IBA AZE	1,306,149	Low	182,137	Low	0.43
Ecuador	Salinas de Ibarra†	ECU93	10,064	Unprotected	Awá-Cotacachi-Illinizas	0.363		96,905	Low	5,747	Low	0.63
Ecuador	Samama Mumbes†	ECU94	2,251	Protected	-----	0.197		42,666	Low	2,076	Low	0.35
Ecuador	Saraguro Las Antenas†	ECU95	1,876	Protected	Sangay Podocarpus	0.30		14,736	Low	2,245	Low	0.51
Ecuador	Selva Alegre	ECU67	11,474	Protected	Sangay Podocarpus	0.20	IBA	71,743	Low	3,181	Low	0.37
Ecuador	Sur de Alamor†	ECU96	5,799	Protected	Bosques Secos de Tumbes-Loja	0.269		90,159	Low	2,233	Low	0.55

Country	KBA name	CEPF Code	Area (hectares)	Protection status	Corridor	RBV	Another	Sum of water balance (mm/year)	Water balance classification	Total carbon stored (t C)	Carbon stock classification	IIA *
Ecuador	Tambo Negro	ECU69	1,945	Protected	Bosques Secos de Tumbes-Loja	0.179	IBA	17,051	Low	2,026	Low	0.59
Ecuador	Territorio Étnico Awá y alrededores	ECU70	204,930	Unprotected	Awá-Cotacachi-Illinizas	0.38	IBA	6,221,010	Medium	400,871	Medium	0.36
Ecuador	Tiquibuzo	ECU71	4,965	Unprotected	-----	0.156	IBA	38,184	Low	2,439	Low	0.44
Ecuador	Uritusinga Cerro Ventanas y Villonaco†	ECU97	14,532	Partially protected	-----	0.31		152,176	Low	5,380	Low	0.62
Ecuador	Utuana-Bosque de Hanne	ECU73	63	Unprotected	Bosques Secos de Tumbes-Loja	0.149	IBA	0	Low	170	Low	0.84
Ecuador	Valle de Guayllabamba	ECU74	24,363	Partially protected	Awá-Cotacachi-Illinizas	0.315	IBA	170,522	Low	1,010	Low	0.56
Ecuador	Valle del Chota†	ECU98	11,104	Unprotected	-----	0.22		67,623	Low	209	Low	0.58
Ecuador	Verde-Ónzole-Cayapas-Canandé	ECU99	222,977	Unprotected	Awá-Cotacachi-Illinizas	0.282	IBA	5,120,188	Medium	507,961	Medium	0.29
Ecuador	Volcán Atacazo	ECU75	9,316	Partially protected	Awá-Cotacachi-Illinizas	0.374	IBA	94,909	Low	7,975	Low	0.31
Ecuador	Yanuncay-Yanasacha	ECU77	39,679	Protected	Oeste de Azuay	0.164	IBA	308,921	Low	12,460	Low	0.26
Ecuador	Yungilla	ECU78	995	Unprotected	Cotopaxi-Amaluza	0.248	AZE	12,982	Low	751	Low	0.63
Ecuador	Zumba-Chito	ECU79	13,967	Protected	Cóndor-Kutukú-Palanda	0.189	IBA	236,168	Low	31,309	Low	0.54
Peru	6 km sur de Ocobamba	PER3	76,568	Unprotected	Cordillera de Vilcanota	0.194	AZE	583,817	Low	38,751	Low	0.18
Peru	Abra Málaga-Vilcanota	PER5	31,083	Partially protected	Cordillera de Vilcanota	0.192	IBA	278,773	Low	11,877	Low	0.18
Peru	Abra Pardo de Miguel	PER6	4,194	Partially protected	Noreste de Peru	0.24		43,369	Low	4,258	Low	0.16

Country	KBA name	CEPF Code	Area (hectares)	Protection status	Corridor	RBV	Another	Sum of water balance (mm/year)	Water balance classification	Total carbon stored (t C)	Carbon stock classification	IIA *
Peru	Abra Patricia-Alto Mayo	PER7	353,410	Partially protected	Noreste de Peru	0.19	IBA	4,946,135	Medium	1,004,272	Medium	0.17
Peru	Alto Valle del Saña	PER10	48,027	Partially protected	-----	0.065	IBA	328,820	Low	38,234	Low	0.19
Peru	Alto Valle Santa Eulalia-Milloc	PER11	19,698	Unprotected	Tierras altas de Lima-Junín	0.123	IBA	179,416	Low	1,290	Low	0.26
Peru	Apacheta-Pilpichaca†	PER98	14,875	Unprotected	-----	0.081		103,152	Low	945	Low	0.33
Peru	Área de Conservación Regional Huaytapallana†	PER99	21,064	Protected	-----	0.104		203,926	Low	1,446	Low	0.21
Peru	Área del Río Mantaro	PER115	84,323	Unprotected	-----	0.029	AZE	520,639	Low	2,215	Low	0.37
Peru	Aypate	PER12	973	Partially protected	-----	0.078	IBA	15,112	Low	1,270	Low	0.19
Peru	Bagua	PER13	5,160	Unprotected	-----	0.119	IBA	48,906	Low	254	Low	0.40
Peru	Bahuaja-Sonene	PER100	1,016,488	Protected	Madidi-Pilón Lajas-Cotapata	0.175	IBA	30,238,012	Very High	3,211,301	Very High	0.09
Peru	Bosque de Cuyas	PER15	2,164	Unprotected	-----	0.134	IBA	22,857	Low	3,709	Low	0.18
Peru	Cajabamba†	PER101	4,058	Unprotected	-----	0.169		51,909	Low	215	Low	0.17
Peru	Calendín	PER16	7,628	Unprotected	-----	0.123		71,846	Low	477	Low	0.24
Peru	Carpish	PER18	211,339	Partially protected	Carpish-Yanachaga	0.16	IBA AZE	1,867,138	Low	291,808	Low	0.31
Peru	Cerro Chinguela	PER20	13,522	Partially protected	-----	0.113	IBA	129,282	Low	18,923	Low	0.26
Peru	Cerro Huanzalá-Huallanca	PER21	6,324	Protected	-----	0.128	IBA	37,187	Low	354	Low	0.48
Peru	Chalhuanca	PER22	1,428	Unprotected	-----	0.046	IBA	12,657	Low	20	Low	0.41
Peru	Champará	PER23	31,195	Partially protected	-----	0.115	IBA	208,408	Low	3,372	Low	0.21
Peru	Chiguata	PER24	30,501	Unprotected	-----	0.053	IBA	-7,562	Low	716	Low	0.12
Peru	Chiñama	PER102	7,966	Unprotected	-----	0.086	IBA	64,288	Low	5,867	Low	0.16

Country	KBA name	CEPF Code	Area (hectares)	Protection status	Corridor	RBV	Another	Sum of water balance (mm/year)	Water balance classification	Total carbon stored (t C)	Carbon stock classification	IIA *
Peru	Chinchipe	PER25	34,555	Unprotected	-----	0.139	IBA AZE	366,950	Low	6,711	Low	0.23
Peru	Chungui-Rumichaca†	PER103	1,476	Unprotected	-----	0.086		14,720	Low	64	Low	0.14
Peru	Conchamarca, Ambo	PER26	3,660	Unprotected	-----	0.12	AZE	32,447	Low	23	Low	0.50
Peru	Cordillera Carabaya	PER27	24,612	Unprotected	Cordillera de Vilcanota	0.135	AZE	215,545	Low	16,200	Low	0.28
Peru	Cordillera de Colán	PER28	134,874	Partially protected	Noreste de Peru	0.20	IBA	1,756,866	Low	311,917	Medium	0.24
Peru	Cordillera de Huancabamba	PER30	50,734	Unprotected	-----	0.191	AZE	396,535	Low	15,787	Low	0.29
Peru	Cordillera del Cóndor	PER31	1,664,005	Partially protected	Cóndor-Kutukú-Palanda	0.251	IBA	43,908,617	Very High	5,601,384	Very High	0.35
Peru	Cordillera Huayhuash y Nor-Oyón	PER32	74,497	Partially protected	-----	0.119	IBA	575,732	Low	2,373	Low	0.21
Peru	Cordillera Vilcabamba	PER33	2,184,233	Partially protected	-----	0.089	IBA	34,613,434	Very High	6,739,821	Very High	0.16
Peru	Cordillera Yanachaga	PER34	105,016	Protected	Carpish-Yanachaga	0.15	IBA AZE	1,837,943	Low	240,366	Low	0.16
Peru	Cotahuasi	PER36	451,538	Protected	-----	0.025	IBA	2,509,466	Medium	34,662	Low	0.08
Peru	Covire	PER37	61,344	Partially protected	-----	0.043	IBA	139,820	Low	8,810	Low	0.15
Peru	Cullcui	PER38	1,619	Unprotected	-----	0.081	IBA	17,899	Low	111	Low	0.36
Peru	Daniel Alomía Robles	PER40	6,324	Unprotected	Carpish-Yanachaga	0.14	AZE	118,952	Low	20,491	Low	0.37
Peru	El Molino	PER41	116,437	Unprotected	-----	0.158	IBA	1,101,834	Low	5,672	Low	0.34
Peru	Entre Puerto Balsa y Moyobamba	PER14	224,396	Unprotected	Noreste de Peru	0.14	AZE	3,650,515	Medium	733,396	Medium	0.22
Peru	Huamba	PER42	2,550	Partially protected	-----	0.14	IBA AZE	31,100	Low	2,709	Low	0.18
Peru	Huasahuasi	PER104	912	Unprotected	-----	0.123	AZE	5,963	Low	135	Low	0.62
Peru	Jaén-Bellavista†	PER105	6,404	Unprotected	-----	0.159		48,154	Low	398	Low	0.34

Country	KBA name	CEPF Code	Area (hectares)	Protection status	Corridor	RBV	Another	Sum of water balance (mm/year)	Water balance classification	Total carbon stored (t C)	Carbon stock classification	IIA *
Peru	Jesús del Monte	PER43	4,966	Protected	-----	0.178	IBA	68,053	Low	15,849	Low	0.18
Peru	Kosñipata-Carabaya	PER44	96,492	Partially protected	Cordillera de Vilcanota	0.177		1,129,535	Low	243,049	Low	0.23
Peru	La Cocha	PER45	18,185	Unprotected	-----	0.07	IBA	150,014	Low	27,311	Low	0.32
Peru	La Esperanza	PER46	1,558	Unprotected	-----	0.09	IBA	15,254	Low	203	Low	0.55
Peru	La Granja†	PER106	534	Unprotected	-----	0.093		6,248	Low	343	Low	0.24
Peru	Lago de Junín	PER48	49,713	Protected	Tierras altas de Lima-Junín	0.092	IBA AZE	342,950	Low	9,020	Low	0.17
Peru	Lago Lagunillas	PER49	4,514	Unprotected	-----	0.048	IBA	24,626	Low	49	Low	0.24
Peru	Lagos Yanacocha	PER50	2,439	Partially protected	Cordillera de Vilcanota	0.165	IBA	20,801	Low	130	Low	0.00
Peru	Laguna de Chacas	PER51	848	Unprotected	-----	0.042	IBA	5,392	Low	43	Low	0.22
Peru	Laguna de los Cóndores	PER52	261,647	Protected	-----	0.168	IBA	2,897,375	Medium	682,364	Medium	0.16
Peru	Laguna Gwengway	PER53	14,678	Unprotected	Carpish-Yanachaga	0.17	AZE	160,471	Low	1,174	Low	0.09
Peru	Laguna Maquera	PER54	120	Unprotected	-----	0.031	IBA	432	Low	16	Low	0.26
Peru	Laguna Umayo	PER55	25,340	Unprotected	-----	0.051	IBA	34,905	Low	1,212	Low	0.26
Peru	Lagunas de Huacarpay	PER56	3,373	Unprotected	-----	0.092	IBA	22,127	Low	66	Low	0.65
Peru	Mandorcasa	PER59	62,444	Partially protected	Cordillera de Vilcanota	0.117	IBA	563,040	Low	22,575	Low	0.12
Peru	Manu	PER60	1,593,485	Protected	Cordillera de Vilcanota	0.146	IBA AZE	32,067,542	Very High	4,972,600	Very High	0.13
Peru	Maraynioc puna	PER107	925	Unprotected	-----	0.162	AZE	4,583	Low	48	Low	0.26
Peru	Marcapomacocha	PER61	20,636	Unprotected	Tierras altas de Lima-Junín	0.101	IBA	196,556	Low	460	Low	0.36
Peru	Maruncunca	PER62	49,712	Unprotected	Madidi-Pilón Lajas-Cotapata	0.143	IBA	1,205,948	Low	139,584	Low	0.53

Country	KBA name	CEPF Code	Area (hectares)	Protection status	Corridor	RBV	Another	Sum of water balance (mm/year)	Water balance classification	Total carbon stored (t C)	Carbon stock classification	IIA *
Peru	Milpo	PER63	4,849	Unprotected	Carpish-Yanachaga	0.17	IBA	49,558	Low	5,201	Low	0.50
Peru	Mina Inca	PER64	2,265	Unprotected	-----	0.181	IBA	87,005	Low	6,811	Low	0.36
Peru	Moyobamba	PER65	91,527	Unprotected	Noreste de Peru	0.18	IBA	1,251,126	Low	204,345	Low	0.44
Peru	Nevado Bolívar†	PER108	3,897	Protected	-----	0.213		56,634	Low	901	Low	0.17
Peru	Occopalca†	PER109	2,041	Unprotected	-----	0.058		9,515	Low	142	Low	0.33
Peru	Paltashaco	PER67	3,350	Unprotected	-----	0.119	IBA	18,298	Low	2,850	Low	0.13
Peru	Pampas Pucacocha y Curicocha	PER68	21,581	Unprotected	Tierras altas de Lima-Junín	0.131	IBA	214,695	Low	1,432	Low	0.40
Peru	Parque Nacional Cerros de Amotape	PER110	153,428	Protected	Bosques Secos de Tumbes-Loja	0.214	IBA	133,786	Low	182,945	Low	0.03
Peru	Parque Nacional Cutervo y sus alrededores	PER39	5,713	Partially protected	-----	0.062	AZE	55,095	Low	7,623	Low	0.14
Peru	Parque Nacional Huascarán	PER70	325,360	Protected	-----	0.14	IBA	2,439,602	Medium	30,390	Low	0.07
Peru	Parque Nacional Tingo María	PER71	4,579	Protected	Carpish-Yanachaga	0.18	IBA	90,283	Low	16,735	Low	0.66
Peru	Pelagatos†	PER111	14,520	Unprotected	-----	0.201		153,952	Low	751	Low	0.26
Peru	Playa Pampa	PER73	1,175	Unprotected	Carpish-Yanachaga	0.15	IBA	10,617	Low	4,566	Low	0.41
Peru	Previsto	PER74	6,474	Unprotected	Carpish-Yanachaga	0.15	AZE	135,236	Low	19,373	Low	0.38
Peru	Pucara†	PER112	3,413	Unprotected	-----	0.073		18,167	Low	691	Low	0.63
Peru	Quincemil	PER75	58,324	Partially protected	Cordillera de Vilcanota	0.191	IBA	2,013,009	Low	135,610	Low	0.33
Peru	Ramis y Arapa (Lake Titicaca, sector Peruano)	PER76	438,804	Unprotected	-----	0.166	IBA AZE	312,644	Low	5,421	Low	0.06
Peru	Reserva Comunal El Sira	PER81	1,634,693	Partially protected	-----	0.093	IBA AZE	32,116,563	Very High	5,525,202	Very High	0.08

Country	KBA name	CEPF Code	Area (hectares)	Protection status	Corridor	RBV	Another	Sum of water balance (mm/year)	Water balance classification	Total carbon stored (t C)	Carbon stock classification	IIA *
Peru	Reserva Nacional Pampa Galeras	PER82	7,395	Protected	-----	0.051	IBA	28,778	Low	179	Low	0.14
Peru	Reserva Nacional Salinas y Aguada Blanca	PER83	337,737	Protected	-----	0.032	IBA	610,071	Low	16,438	Low	0.10
Peru	Reserva Paisajística Nor Yauyos Cochas and buffer zone†	PER113	310,377	Partially protected	-----	0.081		2,550,260	Medium	15,869	Low	0.17
Peru	Río Abiseo y Tayabamba	PER77	309,651	Protected	-----	0.13	IBA	3,504,966	Medium	682,569	Medium	0.20
Peru	Río Araza†	PER97	33,956	Unprotected	Cordillera de Vilcanota	0.184		335,516	Low	27,753	Low	0.41
Peru	Río Cajamarca	PER78	37,871	Unprotected	-----	0.072	IBA	389,366	Low	774	Low	0.39
Peru	Río Mantaro-Cordillera Central	PER79	13,427	Unprotected	-----	0.093	IBA	130,643	Low	15,840	Low	0.31
Peru	Río Marañón	PER80	106,115	Partially protected	-----	0.195	IBA AZE	887,765	Low	16,444	Low	0.23
Peru	Río Utcubamba	PER84	35,534	Unprotected	Noreste de Peru	0.24	IBA	397,863	Low	48,213	Low	0.58
Peru	Runtacocha-Morococha	PER85	33,477	Unprotected	-----	0.079	IBA	217,988	Low	1,102	Low	0.19
Peru	San José de Lourdes	PER86	5,005	Unprotected	Cóndor-Kutukú-Palanda	0.19	IBA	96,946	Low	4,995	Low	0.53
Peru	San Juan Cajamarca	PER117	3,676	Unprotected	-----	0.099	AZE	28,293	Low	171	Low	0.57
Peru	San Marcos	PER88	4,477	Unprotected	-----	0.059	IBA	31,983	Low	29	Low	0.38
Peru	Sandia	PER89	33,077	Unprotected	Madidi-Pilón Lajas-Cotapata	0.125	IBA	590,293	Low	45,193	Low	0.46
Peru	Santuario Histórico Machu Picchu	PER90	34,689	Protected	Cordillera de Vilcanota	0.143	IBA	366,427	Low	35,000	Low	0.11
Peru	Santuario Nacional de Huayllay†	PER118	6,447	Protected	Tierras altas de Lima-Junín	0.062		42,031	Low	330	Low	0.29
Peru	Santuario Nacional del Ampay	PER91	3,577	Protected	-----	0.091	IBA	23,090	Low	2,202	Low	0.26

Country	KBA name	CEPF Code	Area (hectares)	Protection status	Corridor	RBV	Another	Sum of water balance (mm/year)	Water balance classification	Total carbon stored (t C)	Carbon stock classification	IIA *
Peru	Santuario Nacional Tabaconas-Namballe	PER92	33,674	Protected	-----	0.12	IBA	319,082	Low	69,609	Low	0.18
Peru	Sihuas†	PER119	294	Unprotected	-----	0.117		1,994	Low	1	Low	0.61
Peru	Suyo-La Tina	PER120	48,896	Unprotected	Bosques Secos de Tumbes-Loja	0.145	IBA	112,252	Low	36,904	Low	0.34
Peru	Tarapoto	PER93	184,513	Partially protected	-----	0.181	AZE	2,927,401	Medium	493,457	Medium	0.28
Peru	Toldo	PER94	2,864	Partially protected	-----	0.151	IBA	29,439	Low	2,780	Low	0.16
Peru	Valcón	PER95	1,881	Unprotected	Madidi-Pilón Lajas-Cotapata	0.124	IBA	23,695	Low	1,191	Low	0.23
Peru	Valle del Río Santa (Provincia de Santa)	PER116	35,889	Unprotected	-----	0.052	AZE	66,417	Low	2,072	Low	0.21
Peru	Valle Urubamba área cerca de Taray	PER121	3,263	Unprotected	-----	0.118	AZE	22,756	Low	108	Low	0.46
Peru	Volcán Yucamani	PER122	6,185	Partially protected	-----	0.056	IBA	12,983	Low	659	Low	0.17
Peru	Yauli	PER96	3,665	Unprotected	-----	0.048	IBA	23,693	Low	50	Low	0.34
Peru	Zona de amortiguamiento del Parque Nacional Río Abiseo	PER114	627,281	Protected	-----	0.126	AZE	8,316,453	High	1,415,219	High	0.23
Venezuela	Monumento Natural Pico Codazzi	VEN3	15,343	Protected	Cordillera de la Costa Central	0.35	IBA	154,347	Low	33,748	Low	0.31
Venezuela	Palmichal	VEN28	15,649	Unprotected	Cordillera de la Costa Central	0.25	IBA	133,028	Low	27,345	Low	0.05
Venezuela	Parque Nacional El Ávila y alrededores	VEN2	115,129	Partially protected	Cordillera de la Costa Central	0.28	IBA AZE	695,459	Low	190,824	Low	0.24
Venezuela	Parque Nacional El Guácharo	VEN5	46,190	Partially protected	-----	0.28	IBA	457,391	Low	79,394	Low	0.14

Country	KBA name	CEPF Code	Area (hectares)	Protection status	Corridor	RBV	Another	Sum of water balance (mm/year)	Water balance classification	Total carbon stored (t C)	Carbon stock classification	IIA *
Venezuela	Parque Nacional El Tamá	VEN6	160,881	Partially protected	Andes Venezolanos	0.23	IBA AZE	3,515,677	Medium	292,382	Low	0.12
Venezuela	Parque Nacional Guaramacal	VEN7	21,313	Protected	Andes Venezolanos	0.29	IBA	163,437	Low	51,182	Low	0.20
Venezuela	Parque Nacional Guatopo	VEN8	156,405	Partially protected	-----	0.15	IBA	1,499,336	Low	287,104	Low	0.14
Venezuela	Parque Nacional Henri Pittier	VEN9	137,246	Protected	Cordillera de la Costa Central	0.31	IBA AZE	1,091,800	Low	242,458	Low	0.23
Venezuela	Parque Nacional Macarao	VEN10	21,830	Protected	Cordillera de la Costa Central	0.34	IBA	146,631	Low	31,175	Low	0.41
Venezuela	Parque Nacional Mochima	VEN29	124,455	Protected	-----	0.20	IBA	291,466	Low	57,046	Low	0.03
Venezuela	Parque Nacional Páramos Batallón y La Negra y alrededores	VEN21	169,596	Partially protected	Andes Venezolanos	0.23	IBA AZE	1,378,959	Low	165,760	Low	0.22
Venezuela	Parque Nacional Península de Paria	VEN20	50,489	Partially protected	-----	0.36	IBA AZE	465,528	Low	86,587	Low	0.05
Venezuela	Parque Nacional Perijá	VEN12	374,807	Protected	Cordillera de Perijá	0.31	IBA AZE	8,030,311	High	826,476	Medium	0.05
Venezuela	Parque Nacional San Esteban	VEN13	55,570	Protected	Cordillera de la Costa Central	0.27	IBA	357,562	Low	78,255	Low	0.25
Venezuela	Parque Nacional Sierra La Culata	VEN14	244,428	Protected	Andes Venezolanos	0.25	IBA	1,861,157	Low	248,225	Low	0.16
Venezuela	Parque Nacional Sierra Nevada	VEN15	337,605	Protected	Andes Venezolanos	0.22	IBA	3,653,590	Medium	475,189	Medium	0.15
Venezuela	Parque Nacional Tapo-Caparo	VEN16	226,536	Protected	Andes Venezolanos	0.19	IBA	3,030,214	Medium	385,524	Medium	0.14
Venezuela	Parque Nacional Terepaima	VEN17	22,377	Partially protected	Andes Venezolanos	0.12	IBA	161,474	Low	31,521	Low	0.20
Venezuela	Parque Nacional Tirgua (General Manuel Manrique)	VEN30	113,662	Protected	-----	0.18	IBA	979,857	Low	165,360	Low	0.18
Venezuela	Parque Nacional Yacambú	VEN18	39,692	Partially protected	Andes Venezolanos	0.17	IBA	420,761	Low	59,242	Low	0.22

Country	KBA name	CEPF Code	Area (hectares)	Protection status	Corridor	RBV	Another	Sum of water balance (mm/year)	Water balance classification	Total carbon stored (t C)	Carbon stock classification	IIA *
Venezuela	Parque Nacional Yurubí	VEN19	29,690	Protected	-----	0.20	IBA	225,249	Low	68,768	Low	0.24
Venezuela	Parques Nacionales Sierra La Culata and Sierra Nevada y alrededores	VEN23	725,740	Partially protected	Andes Venezolanos	0.24	AZE	1,344,893	Low	95,033	Low	0.17
Venezuela	Refugio de Fauna Silvestre and Reserva de Pesca Parque Nacional Dinira	VEN22	57,534	Protected	Andes Venezolanos	0.17	IBA AZE	330,100	Low	112,886	Low	0.19
Venezuela	Tostós	VEN25	8,201	Unprotected	Andes Venezolanos	0.24	AZE	82,211	Low	8,017	Low	0.28
Venezuela	Zona Protectora Macizo Montañoso del Turimiquire	VEN26	604,645	Unprotected	-----	0.27	IBA AZE	5,312,950	Medium	596,145	Medium	0.10
Venezuela	Zona Protectora San Rafael de Guasare	VEN27	474,581	Unprotected	Cordillera de Perijá	0.26	IBA	3,733,825	Medium	628,299	Medium	0.10

†KBAs nominated/proposed.
‡KBAs nominated between August and December, 2020. Have not been included in the profile analysis.

Appendix 5.3 Changes in KBAs Between 2015 and 2020

Table A5.3.1 KBAs Removed from List Since Publication of Previous Ecosystem Profile (CEPF 2015)

2015 KBAs		2020 KBAs		Reason for Removal
CEPF code	KBA name	CEPF code	KBA name	
BOL1	Alto Amboró			Overlap with Yungas Inferiores/Superiores de Amboró (BOL33 and BOL38).
BOL2	Alto Carrasco and surrounding areas			Overlap with Yungas Inferiores/Superiores de Carrasco (BOL34 and BOL40).
BOL6	Bosque de Polylepis de Mina Elba			Overlap with Cotapata National Park and Integrated Management Natural Area (BOL45).
BOL7	Bosque de Polylepis de Sanja Pampa			Overlap with Cotapata National Park and Integrated Management Natural Area (BOL45).
BOL10	Chulumani-Cajuata			Candidate site in 2015, but not formally confirmed as a KBA.
BOL12	Coroico			Species distribution error, overlap with Cotapata (BOL13).
BOL17	Huayllamarka			Candidate site in 2015, but not formally confirmed as a KBA.
BOL18	Lake Coipasa			Candidate site in 2015, but not formally confirmed as a KBA.
BOL28	Salar de Uyuni			Candidate site in 2015, but not formally confirmed as KBA.
BOL31	Valle La Paz			Candidate site in 2015, but not formally confirmed as a KBA.
BOL43	Zongo Valley			Overlap with Cotapata (BOL13).
COL3	Albania			Overlap of AZE site with the KBA Bosques del Oriente de Risaralda (COL10).
COL4	Alto de Oso			AZE site overlap with the KBA Serranía de los Paraguas (COL106).
COL16, COL17	Cañon del Rio Guatiqua and surroundings, Cañón del Río Guatiquía	COL16	Cañón del Río Guatiquía	Duplicate, name error.
COL24, COL61	Chingaza National Natural Park and surrounding areas, Parque Nacional Natural Chingaza	COL61	Chingaza National Natural Park and surrounding areas	Duplicate, name error.
COL27	Coromoro			AZE site deleted.
COL40	Granjas del Padre Luna	COL42	Hacienda La Victoria, Cordillera Oriental	Location and name error.

2015 KBAs		2020 KBAs		Reason for Removal
CEPF code	**KBA name**	**CEPF code**	**KBA name**	
COL53	Reserva Natural Loros Andinos			Site proposed but not confirmed as a KBA.
COL54	Munchique Sur			Candidate site in 2015, but not officially proposed as a KBA.
COL77	Pueblo Viejo de Ura			Has not been formally proposed as a KBA.
COL78	Purace			Has not been formally proposed as a KBA
COL96	San Isidro			Species distribution error
COL98	Santo Domingo			Species distribution error
COL100 COL101	Selva de Florencia	COL101	Selva de Florencia	Duplicate
COL102 COL107	Serranía de los Yarigues, Serranía de los Yariguíes	COL102	Serranía de los Yariguíes	Duplicate, name error
COL112	Tatama-Paraguas			Site proposed but not confirmed as KBA, overlaps with the KBA Serranía de los Paraguas (COL106).
COL114	Valle de Sibundoy	COL115	Valle de Sibundoy & Laguna de la Cocha	Site expansion, name update
COL118	Las Minas	COL119	Vereda Las Minas and surrounding area	Site expansion, name update
COL121	Serranía de Perijá	COL133	Serranía del Perijá Regional Natural Park	Has not been formally proposed as a KBA, overlaps with the KBA nominated Serranía del Perijá Regional Natural Park.
CHI7	Puquios			Candidate site in 2015, but not formally confirmed as a KBA
CHI8	Reserva Nacional Alto del Loa			Candidate site in 2015, but not formally confirmed as a KBA.
CHI9	Reserva Nacional Las Vicuñas			Candidate site in 2015, but not formally confirmed as a KBA.
ECU7, ECU58	Antisana Ecological Reserve and surrounding areas, Reserva Ecológica Antisana	ECU7	Antisana Ecological Reserve (West) and surrounding areas	Duplicate, name update
ECU8	Cuenca del Azuay			Species distribution error
ECU19	Cabecera del Río Baboso			Possibly extinct trigger species in Ecuador, overlap with Territorio Étnico Awá y alrededores (ECU70).
ECU22, ECU59	Cayambe-Coca Ecological Reserve and surrounding areas, Parque Nacional Cayambe-Coca	ECU59	Parque Nacional Cayambe-Coca	Duplicate

2015 KBAs		2020 KBAs		Reason for Removal
CEPF code	**KBA name**	**CEPF code**	**KBA name**	
ECU30, ECU31	El Ángel-Cerro Golondrinas, El Ángel - Cerro Golondrinas and surroundings	ECU31	El Ángel-Cerro Golondrinas and surroundings	Duplicate, limits extended in 2018 in the AZE upgrade process.
ECU38	Laguna Toreadora			Error in AZE site location and overlap with Cajas-Mazán (ECU20)
ECU40	Los Bancos-Caoni			Candidate site in 2015, but not formally confirmed as a KBA.
ECU42, ECU62	Los Illinizas Ecological Reserve and surroundings	ECU42	Los Illinizas Ecological Reserve and surroundings	Duplicate
ECU46	Region between Parque Nacional Sumaco Napo-Galeras and Baeza Lumbaqui			Candidate site in 2015, but not officially proposed as a KBA.
ECU68	Sumaco Napo Galeras and surroundings	ECU52	Parque Nacional Sumaco-Napo Galeras	Candidate site in 2015, but not formally confirmed as a KBA.
ECU72	Toachi			Candidate site in 2015, but not formally confirmed as a KBA.
PER1	17 km southeast of Aucayacu			Hotspot boundary error
PER2	20 km NW of Boca Apua			Hotspot boundary error
PER4	7 km East of Chachapoyas			Error in species distribution, should be removed as a KBA
PER8	Abra Tangarana			Species taxonomic changes prevent it from triggering an AZE site due to change in threat status, thus the site requires re-evaluation as KBA as well.
PER9	Abra Tapuna			Species distribution error
PER17, PER18	Carpish	PER18	Carpish	Duplicate
PER19	Carretera Otuzco-Huamachuco 2			Species distribution error, species threat status updated to Data Deficient, overlap with other KBAs
PER28, PER29	Cordillera de Colán	PER28	Cordillera de Colán	Duplicate
PER35, PER44	Cosñipata Valley, Kosñipata Carabaya	PER44	Kosñipata Carabaya	Duplicate, error in location
PER47	Lacco-Yavero-Megantoni			Candidate site in 2015, but not formally confirmed as a KBA.
PER57	Llamaquizú stream			Species distribution error
PER58	Los Chilchos to Leymebamba Trail			Species distribution error
PER66	Ocobamba-Cordillera de Vilcanota			Candidate site in 2015, but not formally confirmed as a KBA.

2015 KBAs		2020 KBAs		Reason for Removal
CEPF code	KBA name	CEPF code	KBA name	
PER69	Parque Nacional Cordillera Azul			Hotspot boundary error
PER72	Phara			Species distribution error
PER87	San José de Secce			Species distribution error
VEN1	Cordillera de Caripe	VEN26	Zona Protectora Macizo Montañoso del Turimiquire	Polygon overlap
VEN4	Parque Nacional El Ávila	VEN2	El Avila National Park and surrounding areas	Name change during site update as AZE
VEN6, VEN24	Parque Nacional El Tamá, Tamá	VEN6	Parque Nacional El Tamá	Duplicate, overlapping of polygons
VEN11	Parque Nacional Páramos Batallón y La Negra	VEN21	Páramos Batallón and La Negra National Parks and surrounding areas	Name change during site update as AZE

Table A5.3.2 KBAs Added Since Publication of the Previous Ecosystem Profile (CEPF 2015)

KBAs 2020		Reason for inclusion
CEPF code	KBA name	
ARG66	Chaco de Tartagal	IBA confirmed in 2008, partially overlaps with the hotspot and was found to harbor Andean species.
ARG67	El Peinado Lagoon	IBA confirmed in 2008, partially overlaps with the hotspot and was found to harbor Andean species.
ARG68	Jagüé Plains	IBA confirmed in 2008, partially overlaps with the hotspot and was found to harbor Andean species.
ARG69	Parque Nacional Los Cardones	IBA confirmed in 2008, partially overlaps with the hotspot and was found to harbor Andean species.
ARG70	Quebrada de Escoipe	AZE site confirmed in 2018.
ARG71	Quebrada de las Conchas	IBA confirmed in 2008, partially overlaps with the hotspot and was found to harbor Andean species.
ARG72	Reserva de la Biosfera Parque Nacional San Guillermo	IBA confirmed in 2008, partially overlaps with the hotspot and was found to harbor Andean species.
ARG73	Reserva Provincial Laguna Brava	IBA confirmed in 2008, partially overlaps with the hotspot and was found to harbor Andean species.
ARG74	Sierra de Metán	IBA confirmed in 2008, partially overlaps with the hotspot and was found to harbor Andean species.
ARG75	Sierra Rosario de la Frontera	IBA confirmed in 2008, partially overlaps with the hotspot and was found to harbor Andean species.
ARG76	Yuto y Vinalito	IBA confirmed in 2008, partially overlaps with the hotspot and was found to harbor Andean species.
BOL44	Candelaria-Corani	KBA nominated site for plants and reptiles in 2020 as part of the process coordinated by IUCN-DC and funded by CEPF.
BOL45	Parque Nacional y Área Natural de Manejo Integrado Cotapata	KBA nominated site for plants and reptiles in 2020 as part of the process coordinated by IUCN-DC and funded by CEPF.
BOL46	Parque Nacional Tuni Condoriri	KBA nominated site for plants and reptiles in 2020 as part of the process coordinated by IUCN-DC and funded by CEPF.
BOL47	Choquecamiri	KBA nominated site for plants and reptiles in 2020 as part of the process coordinated by IUCN-DC and funded by CEPF.
BOL48	Cochabamba	AZE site confirmed in 2018.
BOL49	Culpina	AZE site confirmed in 2018.
BOL50	Río Guadalquivir	AZE site confirmed in 2018.
BOL51	Mallasa-Taypichullo	KBA nominated site for plants and reptiles in 2020 as part of the process coordinated by IUCN-DC and funded by CEPF.
BOL52	Pampa Redonda	KBA nominated site for plants and reptiles in 2020 as part of the process coordinated by IUCN-DC and funded by CEPF.
BOL53	Parque Nacional Torotoro	KBA nominated site for plants and reptiles in 2020 as part of the process coordinated by IUCN-DC and funded by CEPF.
BOL54	Río Caballuni	AZE site confirmed in 2018.
BOL55	Río San Juan tributario oeste área prepuna	AZE site confirmed in 2018.
BOL56	Serranía de Aguaragüe	IBA confirmed in 2008, partially overlaps with the hotspot and was found to harbor Andean species.
BOL57	Anexo Tuni-Condoriri	KBA nominated site for plants and reptiles in 2020 as part of the process coordinated by IUCN-DC and funded by CEPF.

KBAs 2020		Reason for inclusion
CEPF code	KBA name	
BOL58	Cerro Azanaques	KBA nominated site for plants and reptiles in 2020 as part of the process coordinated by IUCN-DC and funded by CEPF.
COL122	La Victoria (Nariño)	AZE site proposed in 2018 and confirmed as KBA.
COL123	Caparrapi	KBA nominated site for plants and reptiles in 2020 as part of the process coordinated by IUCN-DC and funded by CEPF.
COL124	Corredor Pisba-Cocuy	KBA nominated site for plants and reptiles in 2020 as part of the process coordinated by IUCN-DC and funded by CEPF.
COL125	Guerrero, Guargua y Laguna Verde	Site proposed in 2020 as part of the CEPF-funded IUCN-DC process.
COL126	Mejue	KBA nominated site for plants and reptiles in 2020 as part of the process coordinated by IUCN-DC and funded by CEPF.
COL127	Paraíso de Aves del Tabor y Magdalena	IBA identified in 2017.
COL128	Páramo de Belmira-Santa Inés y bosques asociados	KBA nominated site for plants and reptiles in 2020 as part of the process coordinated by IUCN-DC and funded by CEPF.
COL129	Páramo del Almorzadero	KBA nominated site for plants and reptiles in 2020 as part of the process coordinated by IUCN-DC and funded by CEPF.
COL130	Páramo Tierra Negra	KBA nominated site for plants and reptiles in 2020 as part of the process coordinated by IUCN-DC and funded by CEPF.
COL131	Parque Natural Regional Cortadera	KBA nominated site for plants and reptiles in 2020 as part of the process coordinated by IUCN-DC and funded by CEPF.
COL132	Parque Natural Regional Santurbán-Salazar de las Palmas	Site proposed in 2020 as part of the CEPF-funded IUCN-DC process.
COL133	Parque Natural Regional Serranía del Perijá	KBA nominated site for plants and reptiles in 2020 as part of the process coordinated by IUCN-DC and funded by CEPF.
COL134	Parque Natural Regional y Reserva Forestal Protectora Regional Páramo de Rabanal	KBA nominated site for plants and reptiles in 2020 as part of the process coordinated by IUCN-DC and funded by CEPF.
COL135	Reserva Forestal Protectora Nacional Río Algodonal	KBA nominated site for plants and reptiles in 2020 as part of the process coordinated by IUCN-DC and funded by CEPF.
COL136	Rocas de Suesca	KBA nominated site for plants and reptiles in 2020 as part of the process coordinated by IUCN-DC and funded by CEPF.
COL137	Unidad Biogeográfica de Siscunci Oceta	KBA nominated site for plants and reptiles in 2020 as part of the process coordinated by IUCN-DC and funded by CEPF.
CHI12	Laguna del Negro Francisco y Laguna Santa Rosa	IBA proposed in 2010, confirmed in 2020, partially overlaps with the hotspot and hosts several typically high Andean species, such as flamingos.
CHI13	Murmuntani	AZE site confirmed in 2018
CHI14	Río Vilama	AZE site confirmed in 2018
CHI15	Zapahuira	AZE site confirmed in 2018
ECU45	Mitad del mundo	KBA nominated site for plants and reptiles in 2020 as part of the process coordinated by IUCN-DC and funded by CEPF.

KBAs 2020		Reason for inclusion
CEPF code	KBA name	
ECU80	Bosque y Vegetación Protector El Chorro	KBA nominated site for plants and reptiles in 2020 as part of the process coordinated by IUCN-DC and funded by CEPF.
ECU81	Cayapas-Santiago-Wimbí	IBA confirmed in 2013, partially overlaps with the hotspot and was found to harbor Andean species.
ECU82	Chilla	KBA nominated site for plants and reptiles in 2020 as part of the process coordinated by IUCN-DC and funded by CEPF.
ECU83	Conchay	KBA nominated site for plants and reptiles in 2020 as part of the process coordinated by IUCN-DC and funded by CEPF.
ECU84	Daucay	IBA confirmed in 2008, partially overlaps with the hotspot and was found to harbor Andean species.
ECU85	El Sauce	KBA nominated site for plants and reptiles in 2020 as part of the process coordinated by IUCN-DC and funded by CEPF.
ECU86	Gualaceo-Limón Indanza	KBA nominated site for plants and reptiles in 2020 as part of the process coordinated by IUCN-DC and funded by CEPF.
ECU87	Guanujo	KBA nominated site for plants and reptiles in 2020 as part of the process coordinated by IUCN-DC and funded by CEPF.
ECU88	Manteles-El Triunfo-Sucre	IBA confirmed in 2014
ECU89	Mashpi-Pachijal	IBA confirmed in 2014
ECU91	Río Jubones	KBA nominated site for plants and reptiles in 2020 as part of the process coordinated by IUCN-DC and funded by CEPF.
ECU92	Río León	KBA nominated site for plants and reptiles in 2020 as part of the process coordinated by IUCN-DC and funded by CEPF.
ECU93	Salinas de Ibarra	KBA nominated site for plants and reptiles in 2020 as part of the process coordinated by IUCN-DC and funded by CEPF.
ECU94	Samama Mumbes	KBA nominated site for plants and reptiles in 2020 as part of the process coordinated by IUCN-DC and funded by CEPF.
ECU95	Saraguro Las Antenas	KBA nominated site for plants and reptiles in 2020 as part of the process coordinated by IUCN-DC and funded by CEPF.
ECU96	Sur de Alamor	KBA nominated site for plants and reptiles in 2020 as part of the process coordinated by IUCN-DC and funded by CEPF.
ECU97	Uritusinga Cerro Ventanas y Villonaco	KBA nominated site for plants and reptiles in 2020 as part of the process coordinated by IUCN-DC and funded by CEPF.
ECU98	Valle del Chota	KBA nominated site for plants and reptiles in 2020 as part of the process coordinated by IUCN-DC and funded by CEPF.
ECU99	Verde-Ónzole-Cayapas-Canandé	IBA confirmed in 2005, partially overlaps with the hotspot and was found to harbor Andean species.
PER97	Río Azara	KBA nominated site for plants and reptiles in 2020 as part of the process coordinated by IUCN-DC and funded by CEPF.
PER98	Apacheta-Pilpichaca	KBA nominated site for plants and reptiles in 2020 as part of the process coordinated by IUCN-DC and funded by CEPF.

KBAs 2020		Reason for inclusion
CEPF code	KBA name	
PER99	Área de Conservación Regional Huaytapallana	KBA nominated site for plants and reptiles in 2020 as part of the process coordinated by IUCN-DC and funded by CEPF.
PER100	Bahuaja-Sonene	IBA confirmed in 2005, partially overlaps with the hotspot and was found to harbor Andean species.
PER101	Cajabamba	KBA nominated site for plants and reptiles in 2020 as part of the process coordinated by IUCN-DC and funded by CEPF.
PER102	Chiñama	IBA confirmed in 2005, partially overlaps with the hotspot and was found to harbor Andean species.
PER103	Chungui-Rumichaca	KBA nominated site for plants and reptiles in 2020 as part of the process coordinated by IUCN-DC and funded by CEPF.
PER104	Huasahuasi	KBA nominated site for plants and reptiles in 2020 as part of the process coordinated by IUCN-DC and funded by CEPF.
PER105	Jaén-Bellavista	KBA nominated site for plants and reptiles in 2020 as part of the process coordinated by IUCN-DC and funded by CEPF.
PER106	La Granja	KBA nominated site for plants and reptiles in 2020 as part of the process coordinated by IUCN-DC and funded by CEPF.
PER107	Maraynioc puna	AZE site confirmed in 2018,
PER108	Nevado Bolívar	KBA nominated site for plants and reptiles in 2020 as part of the process coordinated by IUCN-DC and funded by CEPF.
PER109	Occopalca	KBA nominated site for plants and reptiles in 2020 as part of the process coordinated by IUCN-DC and funded by CEPF.
PER110	Parque Nacional Cerros de Amotape	IBA confirmed in 2008, partially overlaps with the hotspot and was found to harbor Andean species.
PER111	Pelagatos	KBA nominated site for plants and reptiles in 2020 as part of the process coordinated by IUCN-DC and funded by CEPF.
PER112	Pucara	KBA nominated site for plants and reptiles in 2020 as part of the process coordinated by IUCN-DC and funded by CEPF.
PER113	Reserva Paisajística Nor Yauyos Cochas y zona de amortiguamiento	KBA nominated site for plants and reptiles in 2020 as part of the process coordinated by IUCN-DC and funded by CEPF.
PER114	Zona de amortiguamiento del Parque Nacional Río Abiseo	AZE site confirmed in 2018,
PER115	Área Río Mantaro	AZE site confirmed in 2018,
PER116	Valle del Río Santa (Provincia de Santa)	AZE site confirmed in 2018,
PER117	San Juan Cajamarca	AZE site confirmed in 2018,
PER118	Santuario Nacional de Huayllay	KBA nominated site for plants and reptiles in 2020 as part of the process coordinated by IUCN-DC and funded by CEPF.
PER119	Sihuas	KBA nominated site for plants and reptiles in 2020 as part of the process coordinated by IUCN-DC and funded by CEPF.
PER120	Suyo-La Tina	IBA confirmed in 2005, partially overlaps with the hotspot and was found to harbor Andean species.
PER121	Valle Urubamba área cerca de Taray	AZE site confirmed in 2018

KBAs 2020		Reason for inclusion
CEPF code	KBA name	
PER122	Volcán Yucamani	IBA confirmed in 2005, partially overlaps with the hotspot and was found to harbor Andean species.
VEN28	Palmichal	IBA confirmed in 2005, partially overlaps with the hotspot and was found to harbor Andean species.
VEN29	Parque Nacional Mochima	IBA confirmed in 2005, partially overlaps with the hotspot and was found to harbor Andean species.
VEN30	Parque Nacional Tirgua (General Manuel Manrique)	IBA confirmed in 2005, partially overlaps with the hotspot and was found to harbor Andean species.

Appendix 5.4 Methods for Calculating the Relative Biodiversity Value

The Relative Biodiversity Value (RBV) was calculated based on two components: 1) the threat status of species on the IUCN Red List and 2) the extent of the mapped range of threatened species, available from IUCN as of July 2020, as well as the most recent assessment data for plants and reptiles as of August 2020.

Ten categories were established for the species' range size component and three categories (Critically Endangered, Endangered and Vulnerable) were used for the species' threat status according to the IUCN Red List. Based on the combination of the categories of both components, an irreplaceability index was used to rate each species, on a scale of 21 to 50. The highest rating (50) of species irreplaceability refers to Critically Endangered species with a distribution area of less than 2000 km^2; and the lowest (21) refers to Vulnerable species with a distribution area greater than 50 000 km^2 (Table A5.4.1). This method is similar to that used in the previous ecosystem profile (CEPF 2015), which was based on the methodology of Langhammer *et al*. (2007) for the identification of KBA trigger species. In our case the difference is that it is based only on threatened species and does not include restricted distribution species outside the three main global threat categories.

Table A5.4.1 Species Irreplaceability Index for in the Tropical Andes Hotspot

Range size category (km^2)	Irreplaceability index		
	Critically Endangered	Endangered	Vulnerable
< 2,000	50	40	30
2,000 - 5,000	49	39	29
5,000 - 10,000	48	38	28
10,000 - 15,000	47	37	27
15,000 - 20,000	46	36	26
20,000 - 26,000	45	35	25
26,000 - 32,000	44	34	24
32,000 - 40,000	43	33	23
40,000 - 50,000	42	32	22
> 50,000	41	31	21

A hexagon grid of 13 km^2 for the entire hotspot, used in the previous profile (CEPF 2015), was used in order to establish the RBV in each minimum unit of analysis, in this case, in each hexagon of the hotspot. Table A5.4.2 shows an example of how species irreplaceability index values are scored to subsequently calculate the RBV for each hotspot hexagon.

Table A5.4.2 Example of Irreplaceability Index Value Calculation for One Hotspot Hexagon

Species	**IUCN Red List threat status**	**Area of distribution of the species (km²)**	**Irreplaceability value of the species**
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
Rating (sum of the values of the species irreplaceability index)			**189**

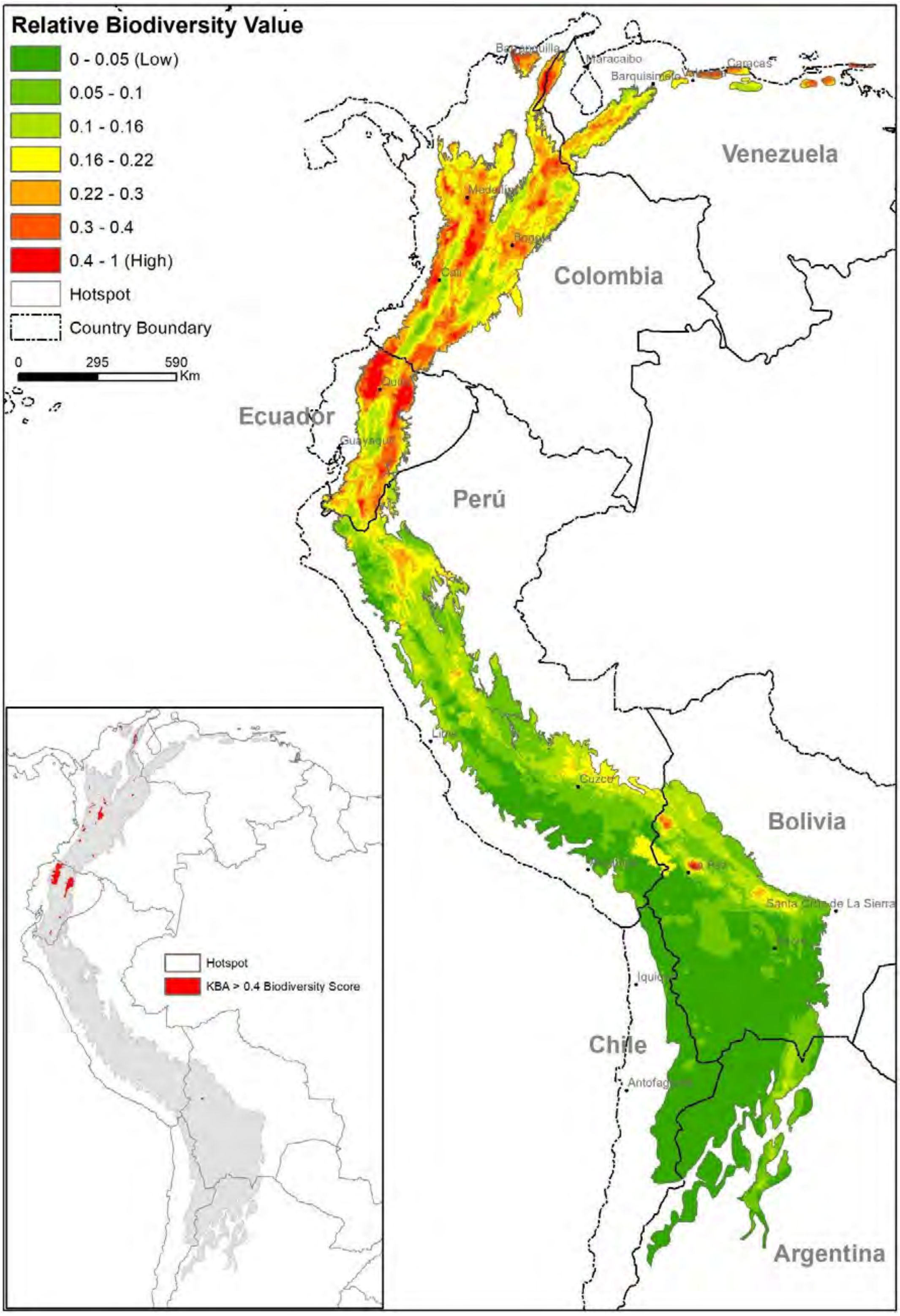
The RBV was calculated based on the sum of the irreplaceability values of all the species intersecting each hexagon. This calculation was initially performed for each taxonomic group (Table A5.4.3), over the entire length of the hotspot hexagon plot. Finally, the values of the nine groups were integrated as a sum of total values for each hexagon of the hotspot.

Table A5.4.3 Taxonomic Groups Considered in the Relative Biodiversity Value Analysis

Taxonomic group	**Group**
Animalia	
Actinopterygii	Fish
Amphibia	Amphibians
Birds	Birds
Mammalia	Mammals
Reptilia	Reptiles
Bivalvia Gastropoda	Molluscs
Insecta Malacostraca	Arthropods
Plantae	
Liliopsida lycopodiopsida Magnoliopsida	Plants
Fungi	
Sordariomycetes	Fungi

As a result of the analysis, a grid of hexagons covering the entire hotspot was obtained, with a RBV assigned to each hexagon, ranging from 0 to 2009. The RBV of each hexagon was normalized, obtaining values on a scale from 0 to 1. For the normalization, each VRB was divided by the highest value of the hexagons of the hotspot (2009, Figure A5.4.1).

Figure A5.4.1 The Relative Biodiversity Value for the Tropical Andes Hotspot



To represent the RBV ranges for the hotspot, the numerical data classification method of numerical data, Natural Breaks or Jenks, was used. This classification is based on the natural groupings inherent to the data, the classes are defined upon grouping of similar values while seeking to maximize the differences between classes. That is, the entities are divided into classes whose limits are established where there are considerable differences between data values.[78] Based on the Natural Breaks classification method, five categories were defined to represent the RBV for the hotspot and assign the RBV category corresponding to the each KBA (Table A5.4.4).

Table A5.4.4 Classification for the RBV in the Tropical Andes Hotspot

Classes		**RBV**
5	Very high	1 - 0.3608
4	High	<0.3608 - 0.2353
3	Medium	<0.2353 - 0.1451
2	Under	<0.1451 - 0.0667
1	Very low	0.0667 - 0

To assign the RBV to the hotspot KBAs, the average VRB of hexagons intersecting each of the hotspot KBAs was calculated (Figure A5.4.3).

[78] https://desktop.arcgis.com/es/arcmap/10.7/map/working-with-layers/classifying-numerical-fields-for-graduated-symbols.htm#:~:text=Rupturas%20naturales%20(Jenks)&text=Los%20cortes%20de%20clase%20se%20caracterizan%20porque%20agrupan%20mejor%20los,los%20valores%20de%20los%20datos.

Figure A5.4.2 Relative Biodiversity Value of the Hotspot, Represented as a Function of the Natural Cuts Method

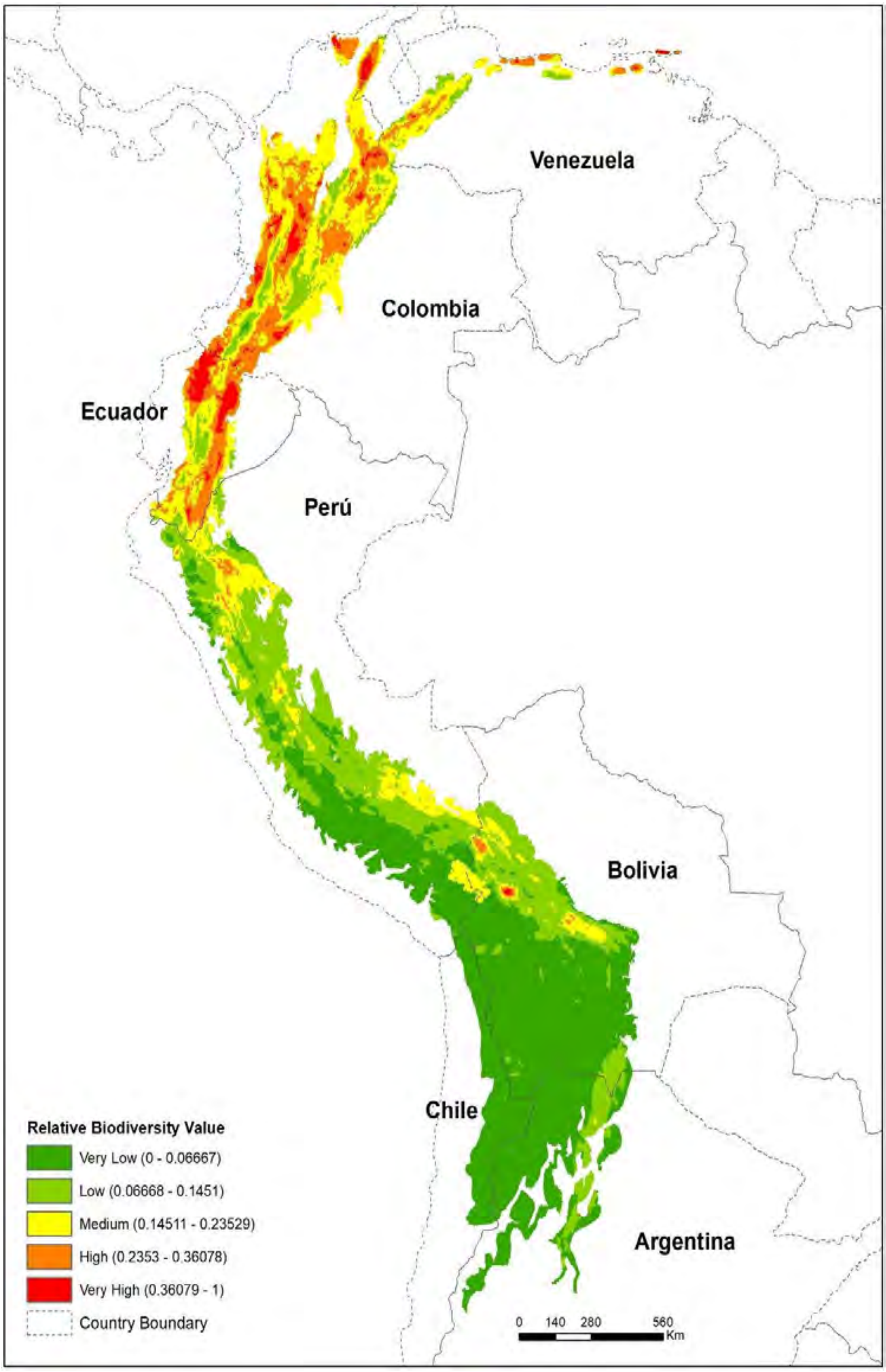
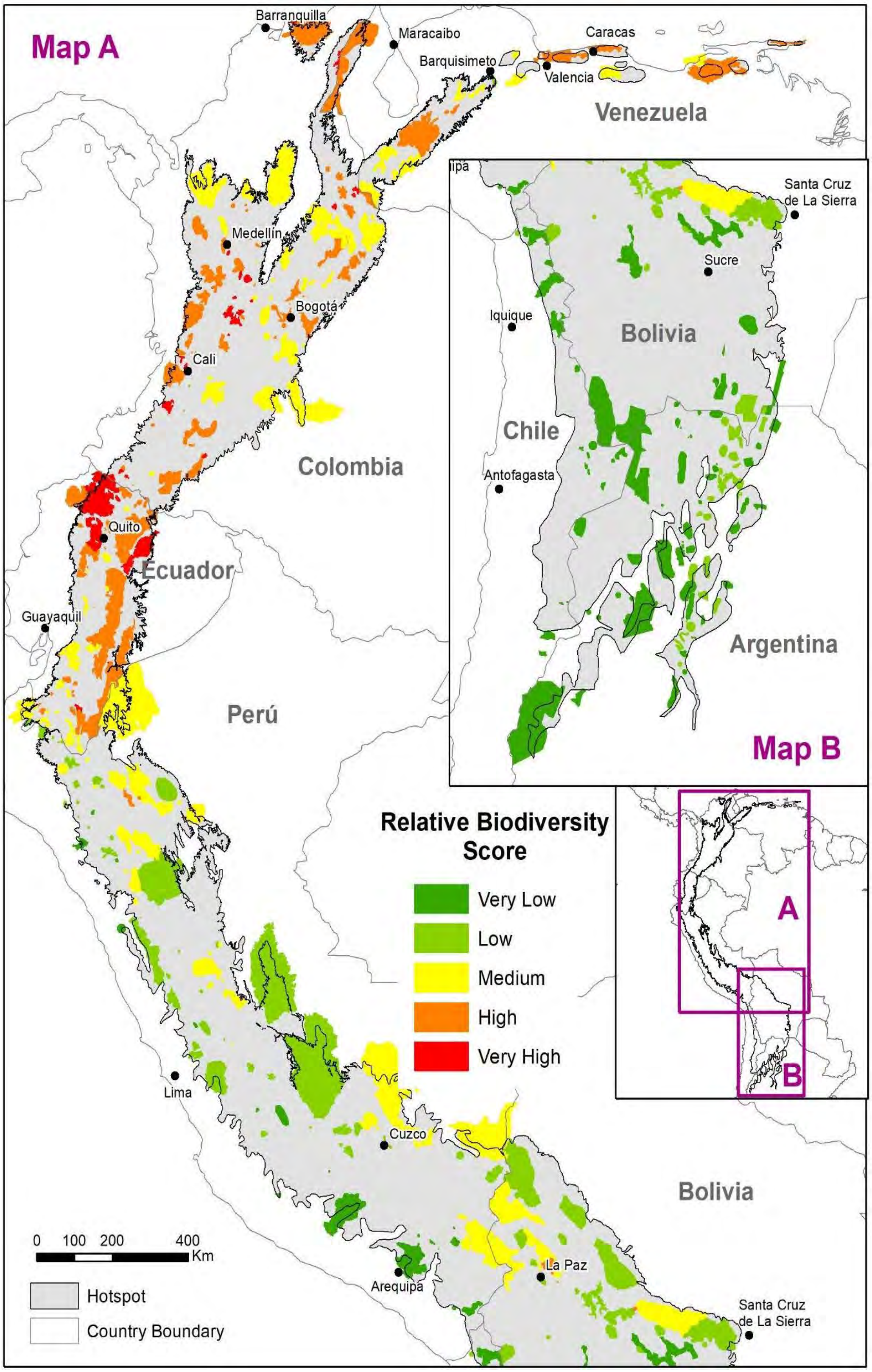


Figure A5.4.3 Relative Biodiversity Value for the KBAs in the Tropical Andes Hotspot KBAs



Appendix 5.5 Methodology for Calculating Water Availability

To calculate water availability in the hotspot, we used the water balance information, calculated from the 1 km^2 spatial resolution data generated based on the model developed b Mulligan (2010)[79], available with updated data on the AguaAndes information platform[80], for the entire hotspot area.

To assign water availability values to each KBA, the sum of the 1 km^2 pixel values of the water availability layer that intersect with the KBA polygons was calculated.

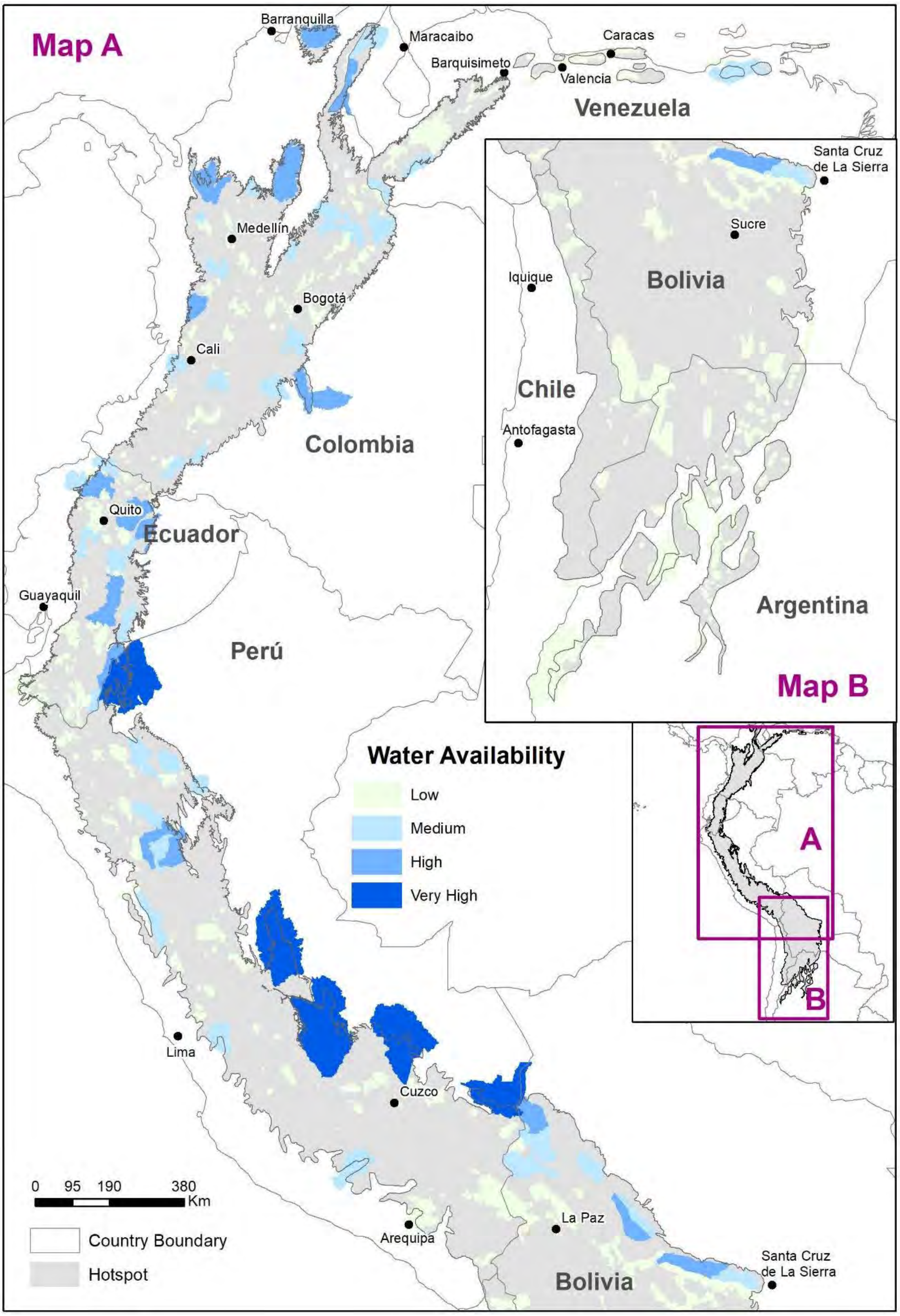
To represent the ecosystem service water availability, the data were classified using the natural breaks method, defining four classes:

Water Availability Classification, mm:
Very High: 20,696,453.44 – 43,908,617.34
High: 6,840,749.50 - 20,696,453.44
Average: 2,145,372.68 – 6,840,749.50
Low: -1,809,550.06 - 2,145,372.68

[79] Mark Mulligan, Jorge Rubianoa, Glenn Hymanb, Douglas Whiteb, James Garciab, Miguel Saraviac, Juan Gabriel Leond, John J. Selvarajd, Tatiana Guttiereze and Luis Leonardo Saenz-Cruz. The Andes basins: biophysical and developmental diversity in a climate of change. Water International Vol. 35, No. 5, September 2010, 472-492 https://www.tandfonline.com/doi/abs/10.1080/02508060.2010.516330

[80] http://www.policysupport.org/waterworld

Figure A5.5.1 Water Availability in the KBAs



Appendix 5.6 Methodology for Calculating Carbon Storage in the Tropical Andes Hotspot

To calculate carbon storage in the hotspot, information corresponding to aboveground biomass carbon storage, calculated from 1 km^2 spatial resolution data generated by Avitabile *et al*. (2016)[81], was used for the entire hotspot area.

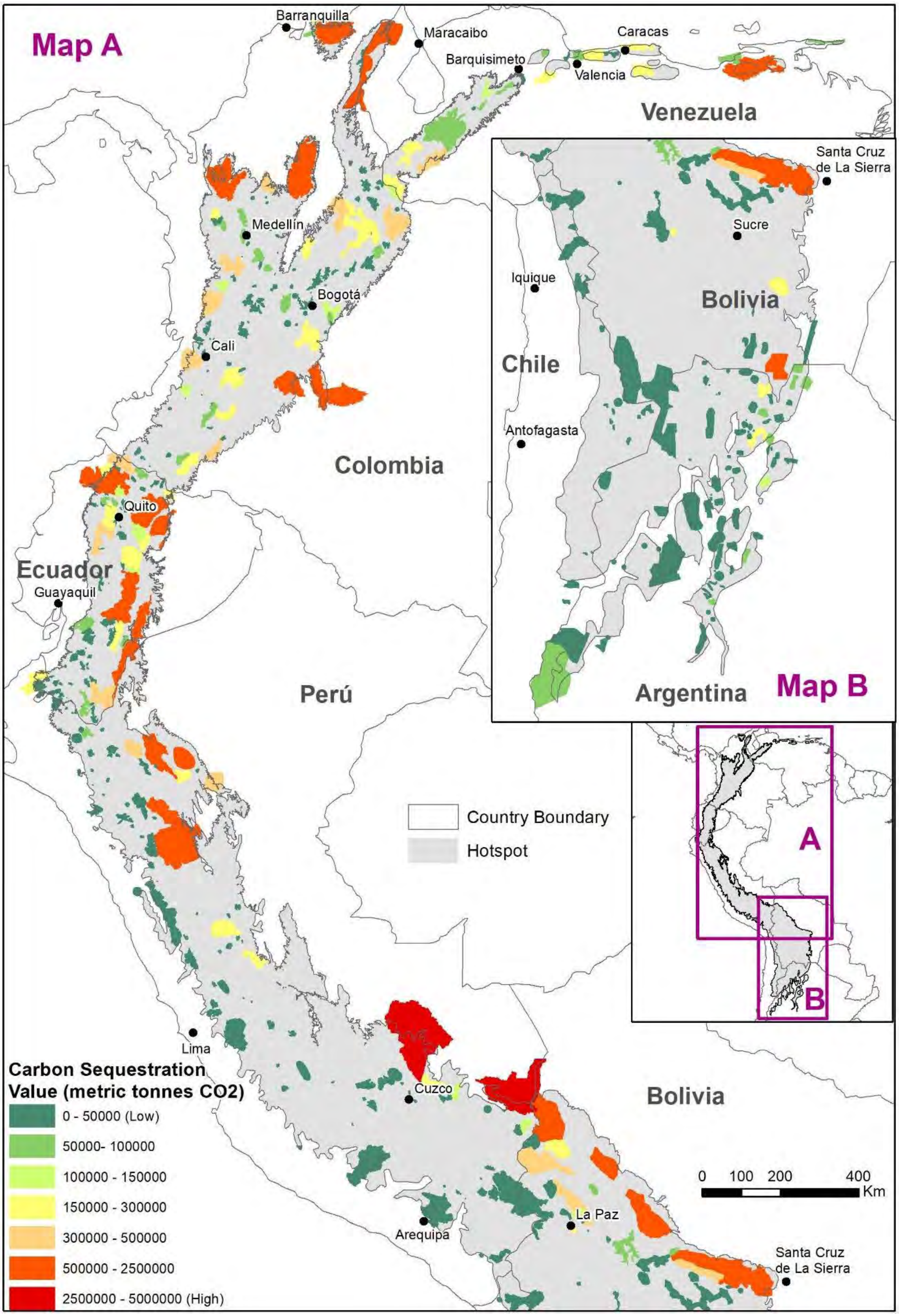
To assign carbon storage values to each KBA, the sum of the 1 km^2 pixel values of the carbon storage layer intersecting the KBA polygons was calculated.

To represent the ecosystem service carbon storage, the data were classified using the natural breaks method, defining four classes:

Carbon Storage Classification, Metric tonnes:
Very high: 3,211,301.33 – 6,739,821.23
High: 1,177,059.12 – 3,211,301.33
Medium: 311,917.19 – 1,177,059.12
Low: 0 – 311,917.19

[81] Avitabile, V., Herold, M., Heuvelink, G. B. M., Lewis, S. L., Phillips, O. L., Asner, G. P., Armston, J., Ashton, P. S., Banin, L., Bayol, N., Berry, N. J., Boeckx, P., de Jong, B. H. J., DeVries, B., Girardin, C. A. J., Kearsley, E., Lindsell, J. A., Lopez-Gonzalez, G., Lucas, R., Malhi, Y., Morel, A., Mitchard, E. T. A., Nagy, L., Qie, L., Quinones, M. J., Ryan, C. M., Ferry, S. J. W., Sunderland, T., Laurin, G. V., Gatti, R. C., Valentini, R., Verbeeck, H., Wijaya, A. and Willcock, S. (2016), An integrated pan-tropical biomass map using multiple reference datasets. Glob Change Biol, 22: 1406-1420. doi:10.1111/gcb.13139. http://onlinelibrary.wiley.com/doi/10.1111/gcb.13139/abstract

Figure A5.6.1 Carbon Storage in the KBAs of the Tropical Andes Hotspot



Appendix 6.1. Methodology for Vulnerability Analysis of a KBA

To quantify the threats to the hotspot, the threat level of each site was defined based on the Cumulative Index of Current Anthropogenic Impacts, derived from the Landscape Condition Model (Comer and Faber-Langendoen 2013)[82] .

The purpose of this model is to evaluate the potential impact of anthropogenic activities on ecosystem integrity, spatially representing the impact of such activities on the hotspot. This model is based on the presence and intensity of activities that are considered incompatible with biodiversity conservation, such as extractive and infrastructure industries, developed during the period 2008 - 2020.

Eight factors have been considered to develop the model: livestock, agriculture, main roads, urban areas, hydrography, mining concessions, airports and hydrocarbon concessions. The model takes into account the current distribution of factors, depending mainly on the availability of information for each country in a specific time period, as shown in Table A6.1.1

Following the spatial representation of each factor, corresponding to the seven hotspot countries, an intensity rating was assigned to the site reflecting the degree to which that type of land use is compatible or not with biodiversity conservation. The intensity ratings of the factors considered in the model were adapted from the study developed by Jarvis *et al*. (2010)[83] for South America.

Table A6.1.1 Factors used for the development of the Cumulative Index of Current Anthropic Impacts

Factors	Intensity	ARG	BOL	CHI	COL	ECU	PER	VEN
Change of land use to livestock/grasslands	Medium		2010	2018	2017		2016	
Change of land use to agriculture	High	2017	2010	2018	2017	2018	2016	
Primary road network	Very High	2017	2016	2018	2018	2015	2019	2010
Urban areas	Very High	2017	2010	2018	2020	2018	2017	2010
Hydrography	Low	2017	2016	2018	2008	2011	2016	2016
Mining concessions	Very High	2017	2012		2017	2019	2020	
Airports	Low	2017	2018	2018	2008	2016	2020	
Hydrocarbon concessions	Low	2017	2017		2020		2019	

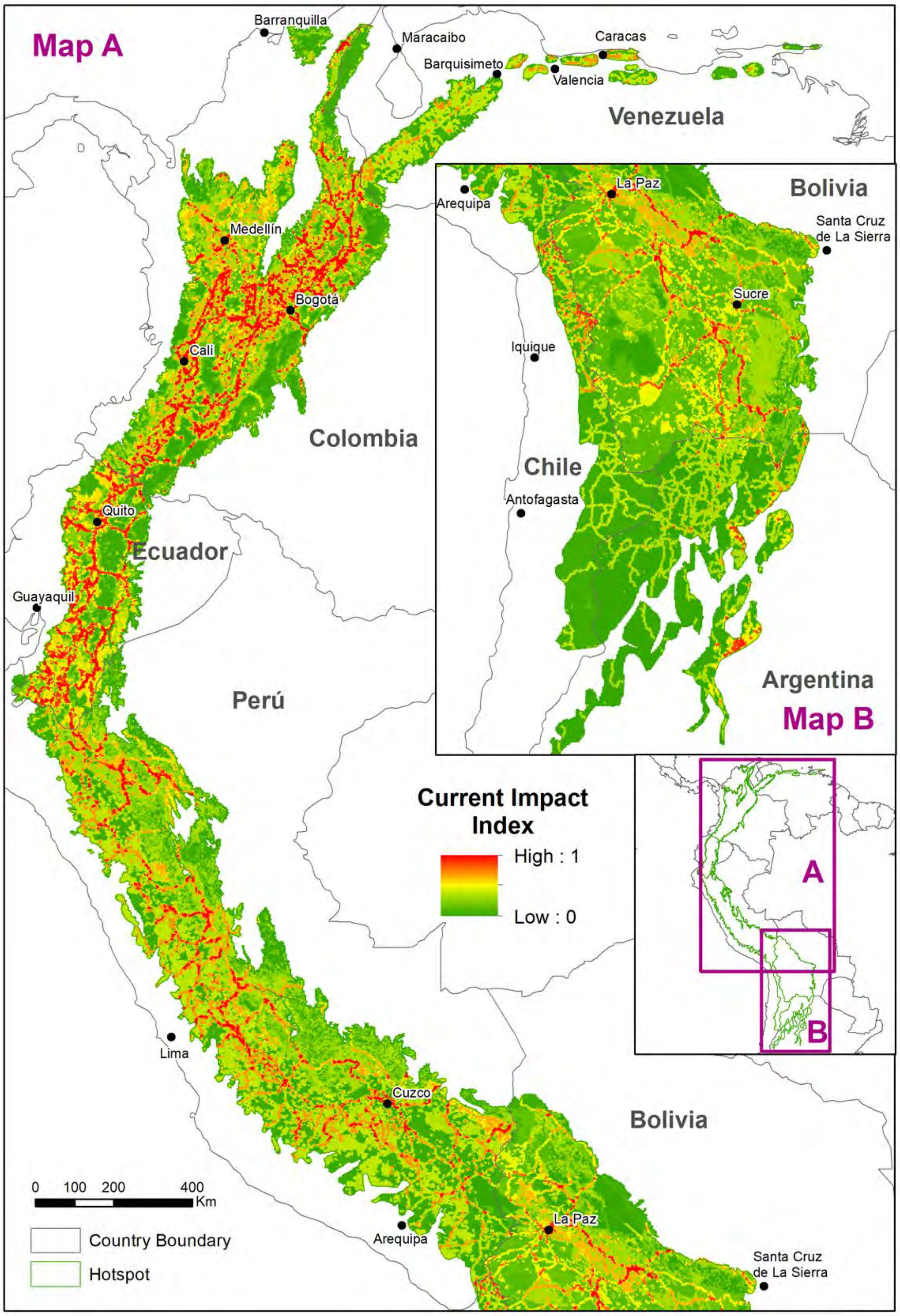
It is important to note that currently the cartographic information of the open data portals of most of the hotspot countries contains updated available and accessible information. However, in the case of Venezuela, the availability of cartographic data to prepare the Cumulative Index of Current Anthropic Impacts has been very limited, due to the fact that its information download portals are deactivated or the information is not available.

The model results are presented using the 13 km^2 hexagon plot covering the entire hotspot, which was used to represent the Relative Biodiversity Value (Figure A6.1.1).

[82] Comer PJ and Faber-Langendoen D. 2013. Assessing Ecological Integrity of Wetlands from National to Local Scales: Exploring the Predictive Power, and Limitations, of Spatial Models. National Wetlands Newsletter 35 (3): 20-22. https://www.natureserve.org/es/biodiversity-science/publications/assessing-ecological-integrity-wetlands-national-local-scales

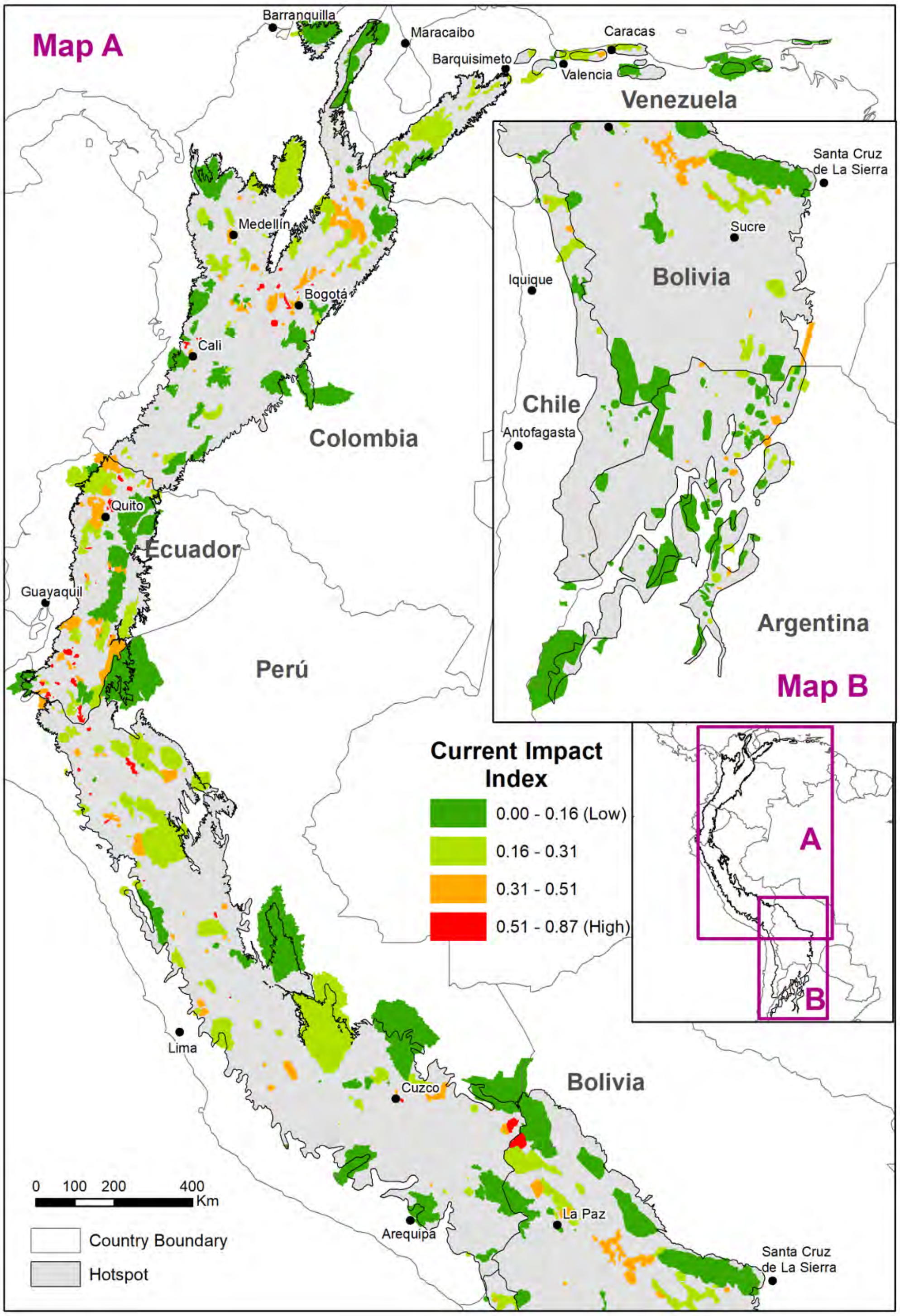
[83] Jarvis A, Touval JL, Castro M, Sotomayor L, Hyman G. 2010. Assessment of threats to ecosystems in South America. Journal for Nature Conservation 18 (3): 180-188. https://www.sciencedirect.com/science/article/abs/pii/S1617138109000685

Figure A6.1.1 Threat Level of the Tropical Andes Hotspot



From the results of the Cumulative Index of Current Anthropogenic Impacts, the average value of the hexagons intersecting the hotspot KBAs was assigned (Figure A6.1.2).

Figure A6.1.2 Threat level of KBAs in the Tropical Andes Hotspot



Appendix 7.1 Population Statistics by Department/Province/State/Region and Approximation for the Tropical Andes Hotspot

Country (Census year)	Department/ Province/State/ Region	Percentage area (%) in hotspot	Population*	Population density (people /km^2)	Population adjusted for hotspot area
Argentina	Jujuy	88	770,881	13	678,375
	Salta	42	1,424,397	8	598,247
	Tucuman	44	1,694,656	64	745,649
	Average population density			28	
	Population in hotspot				**2,022,271**
Bolivia	Chuquisaca	82	637,000	11	522,340
	Cochabamba	79	2,029,000	32	1,602,910
	La Paz	75	2,927,000	20	2,195,250
	Oruro	100	551,000	9	551,000
	Potosi	100	902,000	7	902,000
	Tarija	55	583,000	13	320,650
	Average population density			15	
	Population in hotspot				**6,094,150**
Chile	Antofagasta	40	423,531	5	169,412
	Average population density			5	
	Population in hotspot				**169,412**
Colombia	Antioquia	70	6,677,930	84	4,674,551
	Boyaca	94	1,242,731	47	1,168,167
	Caldas	93	1,018,453	107	947,161
	Cauca	80	1,491,937	43	1,193,550
	Cundinamarca	93	3,242,999	100	3,015,989
	Bogota	100	7,743,955	526	7,743,955
	Huila	100	1,122,622	51	1,122,622
	Nariño	59	1,627,589	49	960,278
	Norte de Santander	67	1,620,318	50	1,085,613
	Quindío	100	555,401	298	555,401
	Risaralda	99	961,055	198	951,444
	Santander	71	2,280,908	64	1,619,445
	Tolima	100	1,339,998	54	1,339,998

Country (Census year)	Department/ Province/State/ Region	Percentage area (%) in hotspot	Population*	Population density (people /km^2)	Population adjusted for hotspot area
	Valle del Cauca	76	4,532,152	182	3,444,436
			Average population density	132	
				Population in hotspot	**29,822,609**
Ecuador	Azuay	96	881,394	76	846,138
	Bolivar	97	209,933	44	203,635
	Cañar	87	281,396	49	244,815
	Carchi	98	186,869	40	183,132
	Chimborazo	100	524,004	72	524,004
	Cotopaxi	92	488,716	52	449,619
	El Oro	53	715,751	51	379,348
	Imbabura	98	476,257	77	466,732
	Loja	93	521,154	37	484,673
	Morona-Santiago	72	196,535	4	141,505
	Pichincha	84	3,228,233	144	2,711,716
	Tungurahua	100	590,600	158	590,600
	Zamora-Chinchipe	100	120,416	10	120,416
			Average population density	63	
				Population in hotspot	**7,346,332**
Peru	Amazon	70	426,806	10	298,764
	Ancash	45	1,180,638	30	531,287
	Apurimac	99	430,736	19	426,429
	Ayacucho	63	668,213	14	420,974
	Cajamarca	87	1,453,711	42	1,264,729
	Cusco	89	1,357,075	16	1,207,797
	Huancavelica	74	365,317	21	270,335
	Huanuco	81	760,267	21	615,816
	Junin	93	1,361,467	28	1,266,164
	La Libertad	43	2,016,771	63	867,212
	Pasco	79	271,904	11	214,804
	Puno	90	1,237,997	19	1,114,197
	San Martin	76	899,648	14	683,732

Country (Census year)	Department/ Province/State/ Region	Percentage area (%) in hotspot	Population*	Population density (people /km^2)	Population adjusted for hotspot area
	Average population density			24	
	Population in hotspot				**9,182,240**
Venezuela	Distrito Capital	54	2,090,479	530	1,128,859
	Merida	86	1,059,925	53	911,536
	Miranda	46	3,323,073	107	1,528,614
	Tachira	74	1,279,248	71	946,644
	Trujillo	66	880,815	42	581,338
	Average population density			161	
	Population in hotspot				**5,096,989**
	Approximate Total Population in the Tropical Andes Hotspot				**59,734,004**

Source: Ecosystem Profile 2015; websites of statistical agencies of hotspot countries.

*Note: Population projected to 2020, based on information taken from the websites of national statistical agencies.

Appendix 11.1. Methodology for Evaluation of Current Conservation Investment in the Hotspot

11.1 General

For the preparation of Chapter 11, a methodology was defined based on that used in the study "Environmental Financing in Peru", prepared for the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) in 2015.

The main task was the construction of a database (BBDD for its acronym in Spanish) in Excel format, with the main information (type and financial source, validity, scope, budget, etc.) of the projects that had influence on the hotspot territory during the period from January 1, 2015 to December 31, 2019.

11.2. Sources used

The sources of information used were mainly secondary. However, when the information was not available on the donors' web pages, they were contacted via e-mail to receive the information.

11.2.1. Secondary sources

Projects were located on the official websites of the following donors:

Multilaterals

- GEF
- EU
- IDB
- World Bank
- GEF Small Grants Program
- CEPF
- UN-REDD
- UNDP
- Nordic Development Fund (NDF)
- ITTO
- FAO
- UNEP
- Green Climate Fund

Bilateral

- USFWS
- USDoS
- USFS
- USAID
- KfW
- GIZ
- BMZ-BMU (Germany)
- International Climate Initiative (IKI, Germany)
- JICA
- Swiss Agency for Development and Cooperation (SDC)
- The Belgian Development Agency (BTC)
- Danish International Development Agency (DANIDA)
- UK Department for International Development (DFID)
- Government of the Netherlands
- Government of Canada
- Australian Government
- Norwegian Agency for Development Cooperation (NORAD)
- Spanish Agency for International Cooperation and Development (AECID)
- French Development Agency (AFD)

Public Sources

- Government of Peru, through the Ministry of Economy and Finance (MEF). User-friendly website[84].
- Government of Colombia, DNP-National Planning Department[85] .
- Government of Ecuador. Ministry of Environment. Transparency (chapters K)[86] .

Foundations

- MacArthur Foundation
- Blue Moon Fund
- Moore Foundation
- Mohamed bin Zayed Conservation Fund
- Overbrook Foundation
- JRS Biodiversity Foundation
- Tinker Foundation
- Jhon Fell Fund
- Wallace Global Fund
- Save Our Species
- Swift Foundation
- Rainforest Trust
- Rainforest Alliance
- Global Wildlife Conservation
- Andes Amazon Fund
- Inter-American Foundation (IAF)
- TNC

Other donors

- EcoFondo
- Forest Trends
- Odebrecht
- Pluspetrol
- RedLAc
- Walt Disney

In addition to this information, we reviewed key literature on public investment policies, programs, plans and projects, as well as the websites of major climate funds, water funds and other international financing.

11.3. Data Capture and Processing. General Aspects

For each project, the official amount, as indicated in the sources described above, was recorded and subsequently adjusted for a series of spatial and temporal factors, so that the amount adjusted for these factors was taken into account in the final accounting.

11.3.1. Projects/Investments at the National Level

Country-level investments that were not specifically targeted to the Tropical Andes region were adjusted for the proportion of the country located within the hotspot. This is a representative value that assumes that country-level investments were evenly distributed throughout the country, which could over or underestimate actual expenditures directed to hotspot conservation.

[84] https://apps5.mineco.gob.pe/transparencia/Navegador/default.aspx
[85] https://www.dnp.gov.co/programas/inversiones-y-finanzas-publicas/Datos-y Statistics/Budget%20of%20Investment%20Pages/Tracking.aspx
[86] https://www.ambiente.gob.ec/transparencia/

Table 11.1. Percentage of Hotspot area within each Country and Adjustment made for each Project

Country	% of Hotspot	Adjustment to each project
Argentina	5.60%	x 0.056
Bolivia	37.20%	x 0.372
Chile	10.00%	x 0.1
Colombia	27.20%	x 0.272
Ecuador	44.20%	x 0.442
Peru	31.10%	x 0.311
Venezuela	6.40%	x 0.064

It should be noted that investments affecting at least 20 percent of the hotspot area were included (thus excluding country-level investments in Argentina, Chile and Venezuela).

11.3.2. Themes Used

The general objective of the initiative was taken into account for the inclusion of the projects in a given theme. In cases where this information was not obtained, the name of the project, components or activities (among others) were taken as a reference. Likewise, there were some duly justified exceptions. The themes identified are:

- Management of protected areas.
- Sustainable management of forests and other natural resources.
- Climate change: adaptation and mitigation.
- Landscape conservation and biological corridors.
- Planning, policy and institutional strengthening.
- Climate change REDD+.
- Watershed conservation.
- Community development and local governance.
- Species conservation.
- Economic incentives for conservation.
- Biodiversity research and environmental monitoring.
- Capacity building.

11.3.3. Location and Spatial Adjustment

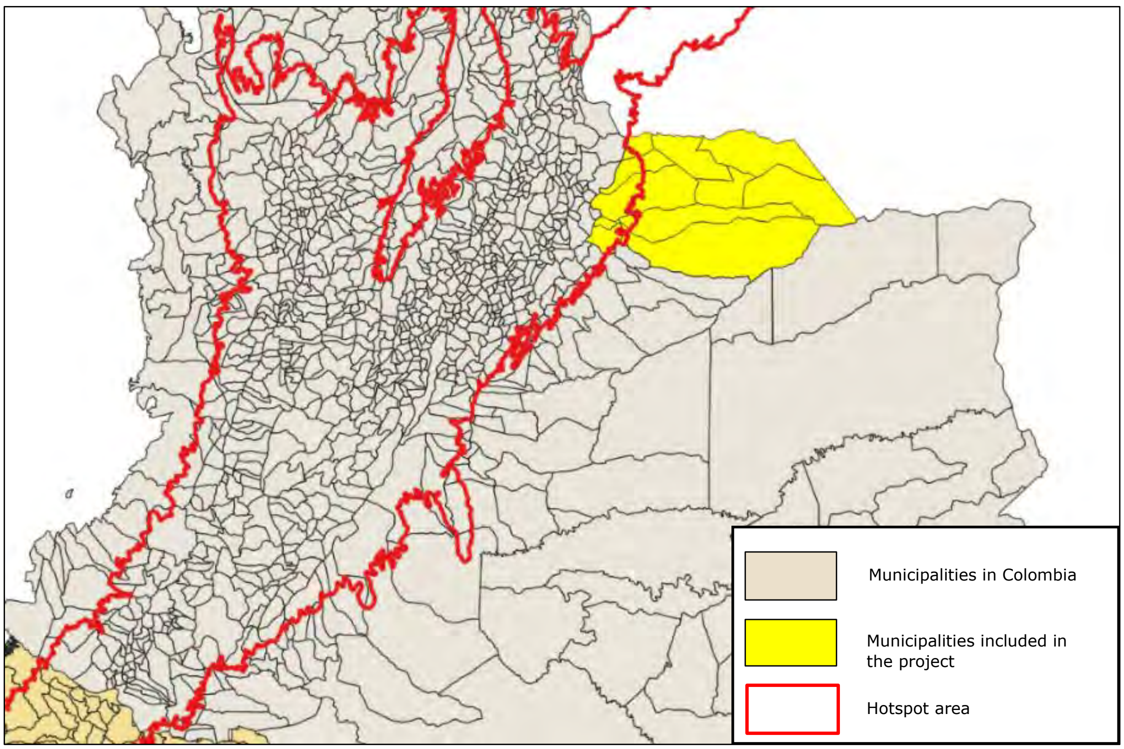
For each project, the most exact location possible was included, taking into account information at the district, municipal or canton level (in the case of Ecuador). In this way, the amount of each project was adjusted by the number of districts of the initiative located within the hotspot, divided by the total number of districts covered by the project.

To establish whether or not a given administrative unit belongs to the hotspot, the layer of municipalities/cantons/districts/departments etc. was crossed with the hotspot polygon. In case such administrative unit was included or intersected with the hotspot, the investment was considered to favor the hotspot, even if the municipality in question was not entirely within the hotspot (Figure 11.1).

For example, for a project that covered 11 municipalities in Colombia, five districts were taken that occupied an area of approximately 50 percent or more within the hotspot. Figure 11.1 shows the adjustment, which for this example was 5 / 11 = x 0.45.

In the case of projects where the location was not obtained at the cantonal, district or municipal level, the location was investigated in greater detail at the watershed level or through other jurisdictions. In the case of not obtaining any spatial information through secondary sources, information should be sought through primary sources, taking into account that there could be an acceptable level of subjectivity.

Figure 11.1. Example of District/Municipal/Cantonal Adjustments



11.3.4. Time Adjustment

The time adjustment was made taking into account that the accounting period is from 2015 to 2019. For each project, the start and end years of the period were recorded. Thus, the time adjustment was made by dividing the number of years of execution in the period 2015 to 2019 by the total number of years of the project. For example, in a project executed between the years 2017 to 2022 the adjustment was: "Number of years between 2015 to 2019 = 3" / "Total number of years of project execution = 6" = Adjustment x 0.50.

11.3.5. Regional Adjustment, when the Project is Implemented in two or more Countries.

For projects with binational, tri-national or greater scope (for example, a US$1.5 million project executed in Ecuador and Peru), the regional adjustment was made taking into account the percentage of execution in each country. When precise information on the scope of the project was not available, the project was considered to be executed equally in each location. This was included in the BBDD in a row (with the same project name) for each country and multiplied by the corresponding adjustment, in this case x 0.50.

Note: "Yes" was recorded in the "Regional" column of the BBDD.

11.3.6. Additional Adjustments

For projects with budgets over US$10 million, some additional adjustments were made and are presented below.

Additional Adjustment for High Investment by Co-financiers

When the value of the co-financing was greater than the amount financed by the donor and/or consists of several co-financiers (public and/or private), the project was divided into as many rows as there were co-financiers in the project. This ensures a correct distribution of the amount invested among the donors who have contributed. An example is shown below:

The project "Conservation of the diversity of Ecuadorian amphibians and sustainable use of their genetic resources" (*Conservación de la diversidad de anfibios ecuatorianos y uso sostenible de sus recursos genéticos*) (link) has a total amount (without filters) of US$12.9 million, which has been financed as follows: US$2.7 million by GEF, US$5.4 million by the Ecuadorian State, US$2.9 million by local governments, US$54,538 by UNDP, US$1.7 million by Centro Jambatu and US$108,350 by Fundación Amaru.[87]

If the general methodology were followed without applying the additional adjustment, the project would be fully awarded to GEF (US$2.7 million + US$10.2 million counterpart), but in this way the investment of the other donors could not be specified in detail and the GEF's investment would be greatly overestimated. See figure below.

Figure 11.2. Example of Adjustment for High Co-Financier Investment

Incorrecto

Proyecto	Fuente	Monto donación	Monto contrapartida en efectivo	Cof. en especie?	Monto TOTAL pyto
5534 Conservación de la diversidad de anfibios ecuatorianos y uso sostenible de sus recursos genéticos	GEF	2,726,908.00	10,183,338.00	sí	12,910,246.00

Correcto

Proyecto	Fuente	Monto donación	Monto contrapartida	Cof. en especie?	Monto TOTAL pyto
5534 Conservación de la diversidad de anfibios ecuatorianos y uso sostenible de sus recursos genéticos	GEF	2,726,908.00		sí	2726908
5534 Conservación de la diversidad de anfibios ecuatorianos y uso sostenible de sus recursos genéticos	Nacion		5,391,444.0	sí	5391444
5534 Conservación de la diversidad de anfibios ecuatorianos y uso sostenible de sus recursos genéticos	Gobiernos locales		2,921,006.0	sí	2921006
5534 Conservación de la diversidad de anfibios ecuatorianos y uso sostenible de sus recursos genéticos	PNUD		54,538.0	sí	54538
5534 Conservación de la diversidad de anfibios ecuatorianos y uso sostenible de sus recursos genéticos	Centro Jambatu		1,708,000.0	sí	1708000
5534 Conservación de la diversidad de anfibios ecuatorianos y uso sostenible de sus recursos genéticos	Amaru		108,350.0	sí	108350

Additional Adjustment for Projects with a Very High Amount of Investment for a Single Theme

[87] It should be noted that only monetary counterparts are considered, and not in kind.

Although it is true, most of the projects have several components and many initiatives include a specific component or objective on monitoring or capacity building (in search of their sustainability), in accordance with what is indicated in point 11.3.2. Otherwise, the systematization of approximately 1,300 projects would have been very complex[88] and unfeasible.

However, it is necessary to perform the exercise in the case of projects with budgets over US$10 million, in order to avoid distorting the figures (and therefore the percentages) assigned to each theme. See the following example:

The EU-funded project "Integrated water and natural resources management" (*Gestión Integral del agua y recursos naturales*) in Bolivia invested US$13.5 million (adjusted amount) in the 2015 to 2019 period in the hotspot. If the entire budget had been allocated to the watershed conservation theme, it would have increased by US$13.5 million with only one project, which would detract from the overall budget allocated to this theme. After reviewing the project, it was noted that this initiative also fit into the climate change and landscape conservation and biological corridor themes. Thus, the US$13.5 million was divided into three items (of US$4.5 million), one for each theme.[89] As in the previous case, a row (with the same name of the project) is included for each of the themes.

11.4. Data Capture and Processing, Creation of the Database

The following is an explanation of each of the variables in the database in Excel format:

One project is recorded in each row (or one project is recorded in several rows according to the exceptions described above). The following variables are recorded in each column:

Table 11.2. Database Variables

Column	Column Name	Description
A	**Number (#)**	Project ID
B	**Project**	Project name
C	**Start Year**	e.g. 2017
D	**Year End**	e.g. 2021
E	**Regional**	Is it a project that covers two or more countries? Possible answers: Yes, No. See paragraph 11.3.5. Regional adjustment
F	**Source**	Name of the financial source. It is necessary to always use the same name for each source. For example: in the case of GEF, the Spanish alternative (FMAM) or GEF should not be used interchangeably.
G	**Type of Source**	Options: Bilateral, multilateral, foundations, other donors, national public: nation, national public: region, national public: others. In the case of public sources, a distinction is made between levels of government because it allows for a more detailed analysis.
H	**Public or Private**	Options: Public and private.
I	**Country**	Options: Argentina, Bolivia, Chile, Colombia, Ecuador, Peru and Venezuela.

[88] More resources are needed to make the budget calculations for each theme for more than 1,300 projects.
[89] Note that column AD (Additional adjustment in blue) has X 0.33 for each row.

<table>
<tr><td>J - S</td><td>Location</td><td>Name of the district(s)/municipality(ies)/canton(s). If further details are not available, include the available detail and use alternative primary or secondary sources for the location of the project.</td></tr>
<tr><td>T</td><td>Hotspot or National</td><td>Options:
Yes: For projects developed within the hotspot area.
No: For projects of national scope (indirectly impacting the hotspot). In this case, the adjustment shall be made according to the provisions of paragraph 11.3.1.</td></tr>
<tr><td>U</td><td>Prioritized Corridors</td><td>Options: Yes, No.
The GIS methodology is used to verify if the districts are part of the hotspot, in this case it is verified if the districts/municipalities/cantons of a project are part of a prioritized corridor.</td></tr>
<tr><td>V</td><td>Corridor Name</td><td>If the previous option is Yes, the name of the prioritized corridor is recorded.
If the previous option chosen is No, N/A is recorded.</td></tr>
<tr><td>W</td><td>Theme</td><td>Selected theme
See 11.3.2. Themes used.</td></tr>
<tr><td>X</td><td>Species</td><td>If the selected theme is Species Conservation, the type of species is recorded. Otherwise, N/A is recorded.</td></tr>
<tr><td>Y</td><td>Species Type</td><td>If the selected theme is Species Conservation, the type of species is recorded.
Options: Amphibian, reptile, insect, mammal, bird, fish, flora.
It is recommended that only one type of species be recorded for better analysis. If the project addresses more than one type of species, the one with the most funding should be chosen.</td></tr>
<tr><td>Z</td><td>Donation Amount</td><td>Total amount invested by the financial source as it appears on the website, official source, email received, etc.</td></tr>
<tr><td>AA</td><td>Counterpart Amount</td><td>Amount of monetary counterpart. The counterpart in kind is not recorded.
Applies to matching projects with an average or moderate amount or less than the amount of the grant (column Z).</td></tr>
<tr><td>AB</td><td>Cofinancing in Kind</td><td>Options: Yes, No.
In case of co-financing in kind.</td></tr>
<tr><td>AC</td><td>Total Project Amount</td><td>Total amount of the financial source and the counterpart.
This corresponds to the total amount of the project (sum of Z + AA).</td></tr>
<tr><td>AD</td><td>Additional Adjustment</td><td>See 11.3.6. Additional adjustments.</td></tr>
<tr><td>AE</td><td>Regional Adjustment</td><td>Corresponds to:
= number of hotspot countries where the project is implemented / number of countries where the project is implemented).
If only implemented in one country this number = 1.</td></tr>
<tr><td>AF</td><td>National Adjustment</td><td>If the option in column T is No, an adjustment is applied as follows:
<table>
<tr><th>Country</th><th>Adjustment to each project</th></tr>
<tr><td>Argentina</td><td>x 0.056</td></tr>
<tr><td>Bolivia</td><td>x 0.372</td></tr>
<tr><td>Chile</td><td>x 0.1</td></tr>
<tr><td>Colombia</td><td>x 0.272</td></tr>
<tr><td>Ecuador</td><td>x 0.442</td></tr>
<tr><td>Peru</td><td>x 0.311</td></tr>
<tr><td>Venezuela</td><td>x 0.064</td></tr>
</table>
If the option in column T is Yes, a 1 is entered in this box.
For more information, see paragraph 11.3.1. National projects/investments.</td></tr>
<tr><td>AG</td><td>Local Adjustment</td><td>= number of cantons or districts or municipalities of the project within the hotspot) / number of cantons or districts or municipalities of the project.

Note: If the project is national scale (i.e. column T = No), then 1 is recorded.</td></tr>
<tr><td>AH</td><td>Temporary Adjustment</td><td>= (No. of years from 2015 to 2019) / (No. of total years of the project)</td></tr>
<tr><td>AI</td><td>Adjusted Amount</td><td>This is the amount that is accounted for all analyses in Chapter 11 (investments).
This column is calculated as follows: AI = AC *AD * AE * AF * AG * AH

$0 < AD \le 1$
$0 < AE \le 1$
$0 < AF \le 1$
$0 < AG \le 1$</td></tr>
</table>

		$0 < AH \leq 1$ (Always $AI \leq AC$)
AL	**Executor**	Name of the executing organization.
AM	**CSO?**	Is the executing agency a Civil Society Organization? Answers: Yes, No.
AN	**International CSO?**	If the answer in column AM is Yes, is the CSO headquartered outside the hotspot countries? Options: Yes for international CSOs. For example: WWF, CI, WCS, etc. No for national CSOs. For example: Pronaturaleza, Panthera, etc. If the answer in column AM is No, N/A is recorded.
AO	**Reference**	Direct link to the project (if the information is from a website).
AP	**Objective or Description**	Objective of the project on which the choice of theme is based.
AQ	**Observations**	Additional detail that is not possible to put in previous columns.

Appendix 13.1. KBA and Corridor Prioritization Methodology

This appendix describes the methodology for prioritizing KBAs and corridors for eligibility for CEPF investment. The Pronaturaleza profiling team led the KBA and corridor prioritization process in Colombia, Peru and Bolivia, while Ecociencia led this prioritization process in Ecuador.

KBA Prioritization steps

Step 1. Evaluate KBAs against nine criteria. The profiling team used the natural cut-off classification methodology for relative biodiversity value as presented in Chapter 5 to select those KBAs to be evaluated against the nine criteria described below. Because no KBAs from Argentina or Chile fell within the medium, high or very high range for relative biodiversity value, KBAs from these two countries did not proceed further in the prioritization process.

Criterion 1. Biological priority. Determined directly by the relative biodiversity value presented in Chapter 5, based on the following scoring:

For Colombia, Peru and Bolivia, the following categories were used:

1 = very low: relative biodiversity value of 0-0.0667
2 = low: relative biodiversity value of 0.0667-0.1451
3 = medium: relative biodiversity value of 0.1451-0.2353
4 = high: relative biodiversity value of 0.2353-0.3608
5 = very high: relative biodiversity value of 0.3608-0.5307

The following categories were used for Ecuador:

1 = low: relative biodiversity value of 0.382-0.42
2 = medium: relative biodiversity value of 0.424-0.459
3 = high: relative biodiversity value of 0.470-0.531
4 = very high: relative biodiversity value of 0.538-0.661

Criterion 2. Degree of threat. Determined by experts in the consultation workshops based on the risk of affecting the fundamental ecological integrity of the KBA over a given period of time.

0 = unknown.
1 = low: the fundamental ecological integrity of the site does not pose a risk within the next 10 years.
2 = medium: fundamental ecological integrity of the site at risk within 5 to 10 years.
3 = high: fundamental ecological integrity of the site at serious risk within the next 3 to 5 years.
4 = very high: fundamental ecological integrity of the site at serious risk within 1 to 3 years.

Criterion 3. Funding Need. Determined directly for each KBA by the experts in the national consultation workshops based on the level of investment in conservation by national and international donors or public entities.

0 = unknown.
2 = low: no need for funding.

3 = medium: there is a need for funding, but it is not critical.
4 = high: there is a significant need for funding.

Criterion 4. Management Need. Determined by the legal protection and the capacity of the management unit of the KBA as defined in the consultations with experts in the national workshops.

Colombia, Peru and Bolivia were determined as follows:
1 = low need: the KBA has strong legal protection and the existing management unit(s) has/have high management capacity.
2 = fair need: the KBA has medium legal protection and the existing management unit(s) has/have medium management capacity.
3 = high need: the KBA has medium legal protection and the existing management unit(s) has/have a low management capacity.
4 = very high need: no part of the KBA has legal protection and/or no management exists in the KBA.

Ecuador was scored as follows:
0 = unknown.
2 = low: improved management is not the main problem for conservation.
3 = medium: improved management is important but not critical.
4 = high: improved management is critical for conservation.

Criterion 5. Civil Society Capacity. Obtained in the national consultations based on the organizational capacity of civil society organizations (CSO) working in the area and their coordinated work around a common agenda.

Colombia, Peru and Bolivia were determined as follows:
0 = unknown.
1 = low: CSO in the area do not have sufficient organizational capacity, and the work of individual organizations prevails. There is no common agenda for the benefit of conservation, nor do they coordinated efforts to generate advocacy and conservation impacts.
2 = medium: CSO working in the area have acceptable organizational capacity; the work of individual organizations prevails. There is no common agenda for the benefit of conservation, nor do they coordinated efforts to generate advocacy and conservation impacts.
3 = high: the CSO working in the area have organizational capacity and are in the process of building a common agenda for the benefit of conservation, articulating the individual efforts of the organizations to generate advocacy and conservation impacts.
4 = very high: CSO working in the area have organizational capacity and are working on a common agenda for the benefit of conservation, articulating their efforts to generate advocacy and conservation impacts.

Ecuador was assessed as follows:
0 = unknown.
1 = low: low CSO capacity or little CSO interest in the area.
2 = medium: the CSOs working in the area have moderate capacity or interest in conservation.
3 = high: there is at least one CSO working in the area that has very good capacity and high interest and at least one other group has good or moderate capacity and interest.

4 = very high: there are two or more CSOs working in the area that have a high interest and very good capacity to carry out conservation work.

Criterion 6. Operational Feasibility. Established by the experts in the national consultations, it measures the feasibility of civil society working in a KBA in compliance with CEPF policies.

0 = unknown.
2 = low: potential obstacles cannot be managed and CEPF investment policies cannot be met.
3 = medium: there are some potential obstacles, but most of them can be managed/avoided.
4 = high: there are no potential obstacles to working at the site.

Criterion 7. Alignment with national priorities. Colombia, Peru and Bolivia have a portfolio of priority areas for conservation that are not protected under any conservation category. This cartographic information is crossed with the polygons of the selected KBAs as follows:

0 = low: no overlap with national priority.
1 = regular: 1-49 percent overlap with national priority.
2 = high: 50-80 percent overlap with national priority.
3 = very high: >80 percent overlap with national priority.

For Ecuador, we analyzed whether the work in the KBA is aligned with national priorities, rating it as follows:
0 = unknown.
2 = low: work in this area is not compatible with current policy priorities.
3 = medium: work in this area is not aligned with national priorities, but it is not in opposition.
4 = high: work in this area is closely aligned with national priorities.

Criterion 8. Opportunity for landscape-scale conservation. It represents the conservation opportunities of the large landscapes present in the Tropical Andes and was scored directly.

Colombia, Peru and Bolivia were scored as follows:
1 = low: When another KBA is more than 10 km away.
2 = fair: When another KBA is less than 10 km away but is not contiguous.
3 = high: Contiguous to another KBA or contiguous to a protected area recognized by the country that connects it to another KBA.

For Ecuador it was rated as follows:
0 = unknown.
2 = low: the site is isolated, or there is no opportunity to influence management.
3 = medium: site part of a larger ecosystem, need/potential to influence landscape-level processes is uncertain.
4 = high: site is part of a larger landscape/ecosystem with opportunities to influence management.

Criterion 9. Consolidate results achieved by CEPF. To ensure that the investments and results achieved in the projects supported during Phase II are sustained and consolidated over the long term. It was scored directly by the CEPF Secretariat.

0 = no investment: CEPF has not invested in this area.
1 = low: work in this area has been marginal or is at an early stage, a major long-term effort is required for consolidation.
3 = medium: work in this area has advanced but consolidation of the conservation vision for the area still requires a medium investment at a medium-term, (three to five years).
4 = high: work in this area has had good results and the opportunities to consolidate conservation of the area require an additional low investment effort in the short-term (no more than two years).

Step 2. Eliminate KBAs where CEPF investment is not feasibile. Low scoring KBAs under criterion 6 for operational feasibility were eliminated from further consideration because these sites lack the basic pre-conditions for performance success. For this reason, no KBAs in Venezuela proceeded further in the prioritization process.

Step 3. Identification of priority KBAs and corridors. The profiling team aggregated scores from the nine criteria for remaining KBAs, with the score for biological importance given double weight. Based on strong recommendations from the consultation process and from the long-term vision for the Tropical Andes, the profiling team made several adjustments to the scoring methodology to arrive at the final list of priority KBAs. These adjustments sought to ensure priority KBAs were located in each of the four countries funded in Phase II, as a means to consolidate and replicate results and best practices obtained to date by CEPF projects, and to ensure that CEPF's investments achieved hotspot-wide results and impacts. In addition, the profiling team sought to focus priority KBAs within a priority conservation corridor, to avoid the dispersal of CEPF funding across a large geographic area, to facilitate an economy of scales and synergies between grants implemented in relative close proximity of each other, to achieve connectivity between KBAs, and ultimately, to achieve durable, resilient corridor-level results and impacts.

Based on these considerations and to adjust for the uneven distribution of KBAs with the highest biodiversity values, the profiling team developed relative thresholds for prioritizing KBAs for each of the four countries as follows: 25 for KBAs in Colombia, 26 for Peru, 27 for Bolivia, and 28 for Ecuador. As a result of these considerations, the profiling team identified 52 KBAs as final priorities located in seven conservation corridors. Following this methodology, several high ranking KBAs were not selected as priorities because they fell outside of a priority corridor.

Appendix 13.2. KBA Ratings for Investment Prioritization

#	Country	Site Code	KBA name	Criterion 1. Biological Priority	Criterion 2. Degree of Threat	Criterion 3. Need for Funding	Criterion 4. Management Need	Criterion 5. CSO Capacity	Criterion 6. Operational Feasibility	Criterion 7. Alignment with national priorities	Criterion 8. Opportunity for landscape-scale conservation	Criterion 9. Consolidate CEPF results achieved	Final Quantification[1]
1	Bolivia	BOL8	Bosque de Polylepis de Taquesi	4	2	3	4	2	3	0	3	2	27
2	Bolivia	BOL13	Cotapata	3	3	4	3	3	3	1	3	3	29
3	Bolivia	BOL45	Parque Nacional y Área Natural de Manejo Integrado Cotapata	4	3	4	2	3	3	1	3	3	30
4	Bolivia	BOL37	Yungas Inferiores de Pilón Lajas	2	2	3	3	3	4	3	3	3	28
5	Bolivia	BOL39	Yungas Superiores de Apolobamba	3	3	4	3	3	4	1	3	0	27
6	Colombia	COL5	Alto de Pisones	5	3	4	3	3	3	0	3	0	29
7	Colombia	COL7	Bosque de San Antonio/Km 18	5	3	4	3	3	3	1	3	3	33
8	Colombia	COL11	Bosques Montanos del Sur de Antioquia	4	3	4	3	3	4	1	2	0	28
9	Colombia	COL36	Enclave Seco del Río Dagua	5	3	4	2	1	4	1	3	0	28
10	Colombia	COL45	La Empalada	4	4	4	2	3	4	0	3	0	28
11	Colombia	COL75	Parque Natural Regional Páramo del Duende	4	2	4	3	3	3	1	3	3	30
12	Colombia	COL80	Región del Alto Calima	4	2	4	3	3	3	1	3	3	30
13	Colombia	COL86	Reserva Natural El Pangán	4	3	4	3	3	3	1	3	0	28
14	Colombia	COL88	Reserva Natural La Planada	5	2	3	2	3	3	1	2	2	28
15	Colombia	COL91	Reserva Natural Río Ñambí	5	2	4	3	3	3	1	3	3	32
16	Colombia	COL106	Serranía de los Paraguas	4	3	3	3	4	3	1	2	3	30
17	Colombia	COL109	Serranía del Pinche	4	4	4	3	3	3	1	1	3	30
18	Colombia	COL65	Parque Nacional Natural Farallones de Cali	4	3	4	2	2	3	1	3	0	26
19	Colombia	COL74	Parque Nacional Natural Tatamá	4	3	4	2	2	3	1	2	0	25
20	Ecuador	ECU1	1 km al oeste de Loja	3	4	4	4	3	3	3	2	0	29
21	Ecuador	ECU2	Abra de Zamora	4	3	4	4	4	3	3	4	4	37
22	Ecuador	ECU3	Acanamá-Guashapamba-Aguirre	3	4	4	4	4	3	4	4	0	33

23	Ecuador	ECU6	Alrededores de Amaluza	2	2	4	4	3	4	4	4	3	32
24	Ecuador	ECU14	Bosque Protector Los Cedros	4	4	4	4	4	3	4	4	0	35
25	Ecuador	ECU16	Bosque Protector Moya-Molón	1	3	4	4	4	4	4	4	0	29
26	Ecuador	ECU25	Cordillera de Huacamayos-San Isidro-Sierra Azul	4	3	4	4	3	3	4	4	0	33
27	Ecuador	ECU28	Corredor Awacachi	2	4	4	4	2	3	3	4	1	29
28	Ecuador	ECU86	Gualaceo - Limón Indanza	1	3	4	4	4	4	4	4	0	29
29	Ecuador	ECU34	Intag-Toisán	1	4	4	3	3	3	3	4	3	29
30	Ecuador	ECU41	Los Bancos - Milpe	4	4	4	4	3	3	3	4	3	36
31	Ecuador	ECU43	Maquipucuna-Río Guayllabamba	4	3	3	3	4	4	3	4	3	35
32	Ecuador	ECU80	Mashpi-Pachijal	4	3	2	2	4	4	3	4	0	30
33	Ecuador	ECU44	Mindo y Estribaciones Occidentales del volcán Pichincha	4	2	3	3	4	4	4	4	3	35
34	Ecuador	ECU45	Montañas de Zapote-Najda	2	2	4	4	3	4	4	4	3	32
35	Ecuador	ECU50	Parque Nacional Podocarpus	3	1	3	2	4	4	4	4	0	28
36	Ecuador	ECU52	Parque Nacional Sumaco-Napo Galeras	3	4	4	4	3	4	4	4	0	33
37	Ecuador	ECU61	Reserva Ecológica Cotacachi-Cayapas	2	3	4	3	4	3	4	4	3	32
38	Ecuador	ECU42	Reserva Ecológica Los Illinizas y alrededores	2	4	4	4	1	3	4	4	0	28
39	Ecuador	ECU54	Río Caoní	3	4	4	3	3	4	3	4	1	32
40	Ecuador	ECU66	Río Toachi-Chiriboga	4	4	4	4	3	3	4	3	0	33
41	Ecuador	ECU81	Saraguro Las Antenas	3	4	4	4	4	3	4	4	0	33
42	Ecuador	ECU64	Reserva Tapichalaca	2	2	4	3	3	4	4	4	0	28
43	Ecuador	ECU70	Territorio étnico Awá y alrededores	1	4	4	4	3	2	4	4	3	30
44	Peru	PER3	6 km sur de Ocobamba	3	2	4	4	2	4	1	3	0	26
45	Peru	PER5	Abra Málaga-Vilcanota	3	3	4	4	2	4	3	3	0	29
46	Peru	PER28	Cordillera de Colán	3	3	4	3	3	4	0	3	2	28
47	Peru	PER44	Kosñipata Carabaya	3	3	4	3	3	3	3	3	3	31
48	Peru	PER50	Lagos Yanacocha	3	3	4	3	2	4	3	2	0	27
49	Peru	PER65	Moyobamba	3	4	4	3	3	3	0	3	0	26
50	Peru	PER75	Quincemil	3	3	4	3	2	3	3	3	0	27
51	Peru	PER97	Río Araza	3	3	4	4	1	4	1	3	0	26
52	Peru	PER84	Río Utcubamba	4	3	4	3	2	4	0	3	3	30

Appendix 13.3. List of Priority Species for the Tropical Andes Hotspot

List of Critically Endangered and Endangered species whose distribution, published by IUCN, overlaps with the KBAs prioritized by CEPF. Includes species threat category and the date of the last assessment of its category in the IUCN Red List of Threatened Species as of July 2020 (IUCN, 2020).

Group	Species	IUCN Global Threat	Last IUCN assessment
Amphibians	*Allobates alessandroi*	EN	2018
	Atelopus coynei	CR	2004
	Atelopus nepiozomus	EN	2016
	Atelopus seminiferus	EN	2017
	Bolitoglossa tatamae	EN	2017
	Bryophryne cophites	EN	2016
	Centrolene ballux	EN	2016
	Centrolene scirtetes	EN	2018
	Cochranella megistra	EN	2016
	Colostethus agilis	EN	2016
	Ctenophryne carpish	EN	2017
	Excidobates mysteriosus	EN	2017
	Gastrotheca cornuta	EN	2008
	Gastrotheca dendronastes	EN	2016
	Gastrotheca nebulanastes	EN	2017
	Gastrotheca ochoai	EN	2017
	Gastrotheca psychrophila	EN	2016
	Gastrotheca stictopleura	EN	2017
	Hyloscirtus charazani	EN	2004
	Hyloscirtus staufferorum	EN	2016
	Hyloxalus chocoensis	EN	2019
	Hyloxalus toachi	EN	2004
	Microkayla guillei	CR	2009
	Microkayla kallawaya	CR	2009
	Microkayla saltator	CR	2009
	Nannophryne corynetes	EN	2017
	Nymphargus armatus	CR	2016
	Nymphargus mixomaculatus	CR	2017
	Oreobates zongoensis	CR	2004
	Oophaga anchicayensis	EN	2019
	Oophaga andresi	EN	2019
	Phrynopus daemon	EN	2017
	Phrynopus dagmarae	EN	2017
	Phrynopus horstpauli	EN	2017
	Phrynopus kauneorum	EN	2017
	Phrynopus vestigiatus	EN	2017
	Bicolor phylobates	EN	2016
	Pristimantis angustilineatus	EN	2016
	Pristimantis apiculatus	EN	2016
	Pristimantis ardalonychus	EN	2017
	Pristimantis balionotus	EN	2004
	Pristimantis baryecuus	EN	2004
	Pristimantis capitonis	EN	2016
	Pristimantis caprifer	CR	2016

	Pristimantis chrysops	CR	2016
	Pristimantis cosnipatae	CR	2017
	Pristimantis degener	EN	2016
	Pristimantis deinops	CR	2016
	Pristimantis dissimulatus	EN	2004
	Pristimantis eugeniae	EN	2004
	Pristimantis hamiotae	CR	2004
	Pristimantis hybotragus	EN	2016
	Pristimantis kelephus	CR	2016
	Pristimantis loustes	EN	2016
	Pristimantis molybrignus	CR	2016
	Pristimantis myops	EN	2018
	Pristimantis ocellatus	EN	2019
	Pristimantis percultus	EN	2004
	Pristimantis phalarus	EN	2016
	Pristimantis ptochus	EN	2018
	Pristimantis pulchridormientes	EN	2018
	Pristimantis pycnodermis	EN	2004
	Pristimantis quantus	EN	2016
	Pristimantis serendipitus	EN	2016
	Pristimantis mean	CR	2017
	Pristimantis sobetes	EN	2004
	Pristimantis tenebrionis	EN	2004
	Pristimantis viridicans	EN	2016
	Pristimantis xylochobates	CR	2016
	Psychrophrynella bagrecito	CR	2017
	Rhaebo colomai	EN	2016
	Rhinella amabilis	CR	2006
	Rhinella arborescandens	EN	2017
	Rhinella chavin	EN	2018
	Silverstoneia erasmios	EN	2018
	Strabomantis cheiroplethus	EN	2016
	Strabomantis helonotus	CR	2004
	Strabomantis ruizi	EN	2016
	Telmatobius brevirostris	EN	2017
	Telmatobius cirrhacelis	CR	2008
	Telmatobius punctatus	EN	2017
	Telmatobius timens	CR	2013
Birds	*Anairetes alpinus*	EN	2016
	Ara ambiguus	EN	2016
	Atlapetes flaviceps	EN	2016
	Bangsia aureocincta	EN	2017
	Cinclodes aricomae	CR	2016
	Cnemathraupis aureodorsalis	EN	2016
	Coeligena orina	CR	2017
	Eriocnemis isabellae	CR	2018
	Eriocnemis mirabilis	EN	2017
	Eriocnemis nigrivestis	CR	2016
	Euchrepomis sharpei	EN	2016
	Geotrygon purpurata	EN	2016
	Grallaria ridgelyi	EN	2016
	Grallaricula ochraceifrons	EN	2016
	Heliangelus regalis	EN	2016
	Leptasthenura xenothorax	EN	2016
	Loddigesia mirabilis	EN	2016
	Neomorphus radiolosus	EN	2016
	Ognorhynchus icterotis	EN	2016

	Penelope ortoni	EN	2018
	Penelope perspicax	EN	2016
	Phibalura boliviana	EN	2016
	Picumnus steindachneri	EN	2016
	Poecilotriccus luluae	EN	2016
	Poospiza rubecula	EN	2016
	Rollandia microptera	EN	2016
	Spizaetus isidori	EN	2016
	Synallaxis maranonica	CR	2018
	Xenoglaux loweryi	EN	2016
Mammals	*Anotomys leander*	EN	2017
	Ateles belzebuth	EN	2019
	Chamek workshops	EN	2015
	Fusciceps workshops	EN	2020
	Lagothrix flavicauda	CR	2019
	Leopardus jacobita	EN	2014
	Mindomys hammondi	EN	2016
	Plecturocebus oenanthe	CR	2011
	Pteronura brasiliensis	EN	2014
	Tapirus pinchaque	EN	2014
	Thomasomys rosalinda	EN	2016
Fish	*Ancistrus marcapatae*	EN	2014
	Astyanax daguae	EN	2014
	Brycon labiatus	EN	2014
	Chaetostoma palmeri	EN	2014
	Cichlasoma gephyrum	EN	2014
	Pimelodus grosskopfii	CR	2014
	Trichomycterus unicolor	EN	2014
Plants	*Anthopterus verticillatus*	EN	2018
	Brayopsis diapensioides	EN	2018
	Cavendishia grandifolia	EN	2018
	Cavendishia jardinensis	CR	2018
	Cavendishia lebroniae	EN	2018
	Cavendishia nuda	CR	2018
	Centropogon gloriosus	EN	2018
	Ceratostema lanceolatum	EN	2018
	Ceratostema nubigena	EN	2018
	Diogenesia amplectens	EN	2018
	Disterigma micranthum	CR	2018
	Freziera apolobambensis	CR	2018
	Loricaria unduaviensis	EN	2018
	Macleania alata	EN	2018
	Magnolia calimaensis	CR	2007
	Magnolia jardinensis	CR	2015
	Magnolia mahechae	EN	2007
	Magnolia silvioi	EN	2007
	Magnolia wolfii	CR	2007
	Nototriche lanata	EN	2018
	Oreanthes glanduliferus	EN	2018
	Oreanthes hypogaeus	EN	2018
	Oreopanax thaumasiophyllus	EN	2018
	Plutarchia ecuadorensis	EN	2018
	Psammisia aurantiaca	EN	2018
	Psammisia flaviflora	EN	2018
	Puya brackeana	CR	2018
	Puya exigua	EN	2018
	Puya fosteriana	EN	2018

	Puya navarroana	EN	2018
	Puya nutans	EN	2018
	Puya obconica	EN	2018
	Puya parviflora	EN	2018
	Puya tillii	EN	2018
	Pycnophyllopsis keraiopetala	EN	2018
	Symplocos robusta	EN	2018
	Themistoclesia campii	CR	2018
	Thibaudia joergensenii	EN	2018
	Vaccinium distichum	EN	2018
	Valeriana johannae	EN	2018
	Xanthosoma tarapotense	EN	2018
Reptiles	*Anolis proboscis*	EN	2014
	Atractus duboisi	EN	2014
	Lepidoblepharis conolepis	EN	2016
	Liolaemus forsteri	EN	2014
	Macropholidus annectens	EN	2014
	Riama colomaromani	EN	2014
	Riama labionis	EN	2014
	Riama petrorum	EN	2014
	Stenocercus varius	EN	2014
	Synophis plectovertebralis	CR	2013

We used distributions of some reptiles soon to be published in IUCN, which have been adjusted as part of the process coordinated by IUCN-DC and funded by CEPF (M. Tognelli, unpublished data).

Appendix 13.4. List of Threatened Species by Prioritized KBAs

List of globally threatened species (CR, EN and VU) whose distribution, published in IUCN, overlaps with the KBAs prioritized by CEPF. Includes its threat category, the date of the last assessment of its category and date of last record (year last observed) in the IUCN Red List of Threatened Species as of July 2020 (IUCN, 2020). It also includes information on the presence of the species in each prioritized KBA according to records from the Global Biodiversity Information Facility (GBIF), an international network and data infrastructure that provides open data on biodiversity on the planet, as of November (GBIF.org, 2020a,b,c) and December 2020 (GBIF.org, 2020d,e,f).

Country	KBA	Group	Species	IUCN Global Threat	Last IUCN assessment	Last IUCN record	GBIF records since 2010
Bolivia	Bosque de Polylepis de Madidi	Amphibians	*Telmatobius marmoratus*	VU	2015		
			Telmatobius sanborni	VU	2008		
			Telmatobius timens	CR	2013		
		Birds	*Agriornis albicauda*	VU	2016		
			Anairetes alpinus	EN	2016		✔
			Asthenes helleri	VU	2016		✔
			Cinclodes aricomae	CR	2016		✔
			Coryphaspiza melanotis	VU	2018		
			Cranioleuca curtata	VU	2016		✔
			Lipaugus uropygialis	VU	2016		✔
			Nothocercus nigrocapillus	VU	2016		✔
			Nothoprocta taczanowskii	VU	2018		
			Primolius couloni	VU	2018		
			Ramphastos culminatus	VU	2016		
			Spizaetus isidori	EN	2016		
			Tinamus tao	VU	2018		
		Mammals	*Hippocamelus antisensis*	VU	2016		
			Lagothrix lagothricha	VU	2020		
			Leopardus jacobita	EN	2014		
			Mazama chunyi	VU	2016		
			Tayassu pecari	VU	2012		
			Tremarctos ornatus	VU	2016		
		Plants	*Brachyotum angustifolium*	VU	2018		
			Brayopsis diapensioides	EN	2018		
			Cedrela odorata	VU	2017		
			Dendrophorbium acuminatissimum	VU	2018		
			Greigia kessleri	VU	2018		
			Gynoxys compressissima	VU	2018		
			Ocotea comata	VU	2018		
			Symplocos robusta	EN	2018		

Country	KBA	Group	Species	IUCN Global Threat	Last IUCN assessment	Last IUCN record	GBIF records since 2010
			Themistoclesia peruviana	VU	2018		
			Themistoclesia unduavensis	VU	2018		
			Weinmannia yungasensis	VU	2018		
			Werneria staticifolia	VU	2018		
Bolivia	Bosque de Polylepis de Taquesi	Amphibians	*Telmatobius marmoratus*	VU	2015		
			Telmatobius verrucosus	VU	2004		
		Birds	*Agriornis albicauda*	VU	2016		
			Cinclodes aricomae	CR	2016		
			Nothocercus nigrocapillus	VU	2016		
			Spizaetus isidori	EN	2016		
		Mammals	*Mazama chunyi*	VU	2016		
			Tremarctos ornatus	VU	2016		
		Plants	*Cedrela odorata*	VU	2017		
			Centropogon gloriosus	EN	2018		
			Gentianella bockii	VU	2018		
			Gentianella chrysantha	VU	2018		
			Greigia kessleri	VU	2018		
			Hedyosmum maximum	VU	2018		
			Loricaria unduaviensis	EN	2018		
			Miconia recondita	VU	2018		
			Monnina autraniana	VU	2018		
			Ocotea comata	VU	2018		
			Ourisia cotapatensis	VU	2018		
			Stangea paulae	VU	2018		
			Themistoclesia peruviana	VU	2018		
			Themistoclesia unduavensis	VU	2018		
			Weinmannia yungasensis	VU	2018		
			Werneria staticifolia	VU	2018		
Bolivia	Cotapata	Amphibians	*Microkayla ankohuma*	VU	2008		
			Microkayla chacaltaya	VU	2008		
			Microkayla illampu	VU	2008		
			Oreobates zongoensis	CR	2004	1996	
			Telmatobius marmoratus	VU	2015		
			Telmatobius verrucosus	VU	2004		
		Birds	*Agriornis albicauda*	VU	2016		
			Anairetes alpinus	EN	2016		✔
			Cinclodes aricomae	CR	2016		

Country	KBA	Group	Species	IUCN Global Threat	Last IUCN assessment	Last IUCN record	GBIF records since 2010
			Lipaugus uropygialis	VU	2016		✔
			Nothocercus nigrocapillus	VU	2016		✔
			Ramphastos culminatus	VU	2016		
			Spizaetus isidori	EN	2016		✔
			Tangara argyrofenges	VU	2018		
			Tinamus tao	VU	2018		
		Mammals	*Mazama chunyi*	VU	2016		
			Tapirus terrestris	VU	2018		
			Tayassu pecari	VU	2012		
			Tremarctos ornatus	VU	2016		
		Fish	*Knodus longus*	VU	2014		
		Plants	*Acaulimalva oriastrum*	VU	2018		
			Apinagia boliviana	VU	2014		
			Brayopsis diapensioides	EN	2018		
			Brayopsis monimocalyx	VU	2018		
			Cedrela odorata	VU	2017		
			Centropogon gloriosus	EN	2018		
			Dendrophorbium acuminatissimum	VU	2018		
			Gentianella bockii	VU	2018		
			Gentianella boliviana	VU	2018		
			Gentianella chrysantha	VU	2018		
			Greigia kessleri	VU	2018		
			Gynoxys compressissima	VU	2018		
			Hedyosmum maximum	VU	2018		
			Isoetes herzogii	VU	2014		
			Krapfia haemantha	VU	2018		
			Loricaria unduaviensis	EN	2018		
			Miconia recondita	VU	2018		
			Monnina autraniana	VU	2018		
			Ocotea comata	VU	2018		
			Oreopanax thaumasiophyllus	EN	2018		
			Ourisia cotapatensis	VU	2018		
			Puya fosteriana	EN	2018		
			Pycnophyllopsis keraiopetala	EN	2018		
			Stangea paulae	VU	2018		
			Symplocos robusta	EN	2018		
			Themistoclesia peruviana	VU	2018		
			Themistoclesia unduavensis	VU	2018		

Country	KBA	Group	Species	IUCN Global Threat	Last IUCN assessment	Last IUCN record	GBIF records since 2010
			Valeriana johannae	EN	2018		
			Weinmannia yungasensis	VU	2018		
			Werneria staticifolia	VU	2018		
Bolivia	Parque Nacional Tuni Condoriri	Amphibians	*Telmatobius marmoratus*	VU	2015		
		Birds	*Agriornis albicauda*	VU	2016		
			Cinclodes aricomae	CR	2016		
			Rollandia microptera	EN	2016		
			Spizaetus isidori	EN	2016		
		Mammals	*Mazama chunyi*	VU	2016		
			Tremarctos ornatus	VU	2016		
		Plants	*Acaulimalva oriastrum*	VU	2018		
			Brayopsis monimocalyx	VU	2018		
			Cedrela odorata	VU	2017		
			Centropogon gloriosus	EN	2018		
			Gentianella bockii	VU	2018		
			Gentianella boliviana	VU	2018		
			Isoetes herzogii	VU	2014		
			Krapfia haemantha	VU	2018		
			Miconia recondita	VU	2018		
			Pycnophyllopsis keraiopetala	EN	2018		
			Stangea paulae	VU	2018		
			Valeriana johannae	EN	2018		
			Werneria staticifolia	VU	2018		
		Reptiles	*Liolaemus forsteri*	EN	2014		✔
Bolivia	Parque Nacional y Área Natural de Manejo Integrado Cotapata	Amphibians	*Microkayla chacaltaya*	VU	2008		
			Telmatobius marmoratus	VU	2015		
			Telmatobius verrucosus	VU	2004		
		Birds	*Agriornis albicauda*	VU	2016		
			Anairetes alpinus	EN	2016		✔
			Cinclodes aricomae	CR	2016		✔
			Lipaugus uropygialis	VU	2016		✔
			Nothocercus nigrocapillus	VU	2016		✔
			Spizaetus isidori	EN	2016		
			Tangara argyrofenges	VU	2018		
		Mammals	*Mazama chunyi*	VU	2016		
			Tayassu pecari	VU	2012		
			Tremarctos ornatus	VU	2016		
		Fish	*Knodus longus*	VU	2014		
		Plants	*Acaulimalva oriastrum*	VU	2018		
			Apinagia boliviana	VU	2014		

Country	KBA	Group	Species	IUCN Global Threat	Last IUCN assessment	Last IUCN record	GBIF records since 2010
			Brayopsis diapensioides	EN	2018		
			Brayopsis monimocalyx	VU	2018		
			Cedrela odorata	VU	2017		
			Centropogon gloriosus	EN	2018		
			Dendrophorbium acuminatissimum	VU	2018		
			Gentianella bockii	VU	2018		
			Gentianella boliviana	VU	2018		
			Gentianella chrysantha	VU	2018		
			Greigia kessleri	VU	2018		
			Gynoxys compressissima	VU	2018		
			Hedyosmum maximum	VU	2018		
			Isoetes herzogii	VU	2014		
			Krapfia haemantha	VU	2018		
			Loricaria unduaviensis	EN	2018		
			Miconia recondita	VU	2018		
			Monnina autraniana	VU	2018		
			Ocotea comata	VU	2018		
			Oreopanax thaumasiophyllus	EN	2018		
			Ourisia cotapatensis	VU	2018		
			Puya fosteriana	EN	2018		
			Pycnophyllopsis keraiopetala	EN	2018		
			Stangea paulae	VU	2018		
			Symplocos robusta	EN	2018		
			Themistoclesia peruviana	VU	2018		
			Themistoclesia unduavensis	VU	2018		
			Weinmannia yungasensis	VU	2018		
			Werneria staticifolia	VU	2018		
		Reptiles	*Liolaemus forsteri*	EN	2014		
Bolivia	Yungas Inferiores de Pilón Lajas	Amphibians	*Atelopus tricolor*	VU	2004		
		Birds	*Agamia agami*	VU	2016		
			Alectrurus tricolor	VU	2016		
			Ara militaris	VU	2016		
			Coryphaspiza melanotis	VU	2018		
			Culicivora caudacuta	VU	2016		
			Neomorphus geoffroyi	VU	2016		
			Patagioenas subvinacea	VU	2016		
			Phyllomyias weedeni	VU	2016		✔

Country	KBA	Group	Species	IUCN Global Threat	Last IUCN assessment	Last IUCN record	GBIF records since 2010
			Ramphastos culminatus	VU	2016		
			Spizaetus isidori	EN	2016		
			Tinamus tao	VU	2018		
		Mammals	*Ateles chamek*	EN	2015		
			Mazama chunyi	VU	2016		
			Myrmecophaga tridactyla	VU	2013		
			Priodontes maximus	VU	2013		
			Tapirus terrestris	VU	2018		
			Tayassu pecari	VU	2012		
		Fish	*Ancistrus bolivianus*	VU	2014		
		Plants	*Cedrela odorata*	VU	2017		
Bolivia	Yungas Superiores de Apolobamba	Amphibians	*Hyloscirtus charazani*	EN	2004		
			Microkayla guillei	CR	2009		
			Microkayla kallawaya	CR	2009		
			Microkayla saltator	CR	2009		
			Telmatobius marmoratus	VU	2015		
			Telmatobius sanborni	VU	2008		
			Telmatobius timens	CR	2013		
			Telmatobius verrucosus	VU	2004		
		Birds	*Agriornis albicauda*	VU	2016		
			Anairetes alpinus	EN	2016		✔
			Ara militaris	VU	2016		✔
			Asthenes helleri	VU	2016		✔
			Cinclodes aricomae	CR	2016		
			Cranioleuca curtata	VU	2016		✔
			Euchrepomis sharpei	EN	2016		
			Lipaugus uropygialis	VU	2016		
			Nothocercus nigrocapillus	VU	2016		✔
			Nothoprocta taczanowskii	VU	2018		
			Phibalura boliviana	EN	2016		
			Primolius couloni	VU	2018		
			Ramphastos culminatus	VU	2016		
			Spizaetus isidori	EN	2016		✔
			Tangara argyrofenges	VU	2018		
			Tinamus tao	VU	2018		
		Mammals	*Hippocamelus antisensis*	VU	2016		
			Lagothrix lagothricha	VU	2020		
			Leopardus jacobita	EN	2014		
			Mazama chunyi	VU	2016		
			Tapirus terrestris	VU	2018		
			Tayassu pecari	VU	2012		

Country	KBA	Group	Species	IUCN Global Threat	Last IUCN assessment	Last IUCN record	GBIF records since 2010
			Tremarctos ornatus	VU	2016		
		Plants	*Apinagia boliviana*	VU	2014		
			Brachyotum angustifolium	VU	2018		
			Brayopsis diapensioides	EN	2018		
			Brayopsis monimocalyx	VU	2018		
			Cedrela odorata	VU	2017		
			Dendrophorbium acuminatissimum	VU	2018		
			Freziera apolobambensis	CR	2018		
			Gentianella bockii	VU	2018		
			Greigia kessleri	VU	2018		
			Gynoxys compressissima	VU	2018		
			Loricaria unduaviensis	EN	2018		
			Nototriche lanata	EN	2018		
			Ocotea comata	VU	2018		
			Puya cochabambensis	VU	2018		
			Pycnophyllopsis keraiopetala	EN	2018		
			Stangea paulae	VU	2018		
			Symplocos robusta	EN	2018		
			Themistoclesia peruviana	VU	2018		
			Themistoclesia unduavensis	VU	2018		
			Weinmannia yungasensis	VU	2018		
			Werneria staticifolia	VU	2018		
Colombia	Alto de Pisones	Amphibians	*Bolitoglossa tatamae*	EN	2017		
			Cochranella xanthocheridia	VU	2017		
			Gastrotheca dendronastes	EN	2016		
			Hyloscirtus simmonsi	VU	2017		
			Pristimantis calcaratus	VU	2016		
			Pristimantis juanchoi	VU	2016		
			Pristimantis polychrus	VU	2017		
			Pristimantis ptochus	EN	2018		
			Pristimantis ruedai	VU	2017		
			Silverstoneia erasmios	EN	2018		
		Birds	*Ara militaris*	VU	2016		
			Atlapetes flaviceps	EN	2016		
			Bangsia aureocincta	EN	2017		

Country	KBA	Group	Species	IUCN Global Threat	Last IUCN assessment	Last IUCN record	GBIF records since 2010
			Bangsia melanochlamys	VU	2016		
			Chaetura pelagica	VU	2018		
			Geotrygon purpurata	EN	2016		
			Glaucidium nubicola	VU	2016		
			Hypopyrrhus pyrohypogaster	VU	2018		
			Micrastur plumbeus	VU	2016		
			Spizaetus isidori	EN	2016		
		Mammals	*Aotus lemurinus*	VU	2008		
			Ateles fusciceps	EN	2020		
			Mustela felipei	VU	2016		
			Tayassu pecari	VU	2012		
			Thomasomys bombycinus	VU	2016		
		Plants	*Cavendishia macrocephala*	VU	2018		
			Cedrela odorata	VU	2017		
			Magnolia wolfii	CR	2007	2006	
			Themistoclesia rostrata	VU	2018		
		Reptiles	*Riama laevis*	VU	2013		
Colombia	Bosque de San Antonio/ Km 18	Amphibians	*Centrolene heloderma*	VU	2016	1996	
			Gastrotheca dendronastes	EN	2016		
			Nymphargus ruizi	VU	2016		
			Pristimantis calcaratus	VU	2016		✔
			Pristimantis capitonis	EN	2016		
			Pristimantis deinops	CR	2016		
			Pristimantis gracilis	VU	2016		
			Pristimantis juanchoi	VU	2016		✔
			Pristimantis platychilus	VU	2016		
			Pristimantis silverstonei	VU	2016		
			Pristimantis viridicans	EN	2016		
			Strabomantis ruizi	EN	2016		
		Birds	*Atlapetes flaviceps*	EN	2016		
			Chaetura pelagica	VU	2018		
			Chloropipo flavicapilla	VU	2016		✔
			Conopias cinchoneti	VU	2016		✔
			Dacnis hartlaubi	VU	2016		
			Grallaricula cucullata	VU	2016		
			Ognorhynchus icterotis	EN	2016		
			Patagioenas subvinacea	VU	2016		✔

Country	KBA	Group	Species	IUCN Global Threat	Last IUCN assessment	Last IUCN record	GBIF records since 2010
			Penelope perspicax	EN	2016		
			Spizaetus isidori	EN	2016		
		Mammals	*Ateles fusciceps*	EN	2020		
			Balantiopteryx infusca	VU	2014		
			Leopardus tigrinus	VU	2016		
			Mustela felipei	VU	2016		
			Myrmecophaga tridactyla	VU	2013		
		Fish	*Astroblepus ventralis*	VU	2014		
			Genycharax tarpon	VU	2014		
			Ichthyoelephas longirostris	VU	2014		
			Pimelodella macrocephala	VU	2014		
			Pimelodus grosskopfii	CR	2014		
		Plants	*Cedrela odorata*	VU	2017		
			Macleania crassa	VU	2018		
			Magnolia calimaensis	CR	2007		
		Reptiles	*Riama laevis*	VU	2013		✔
Colombia	Bosques del Oriente de Risaralda	Amphibians	*Andinobates bombetes*	VU	2016		
			Colostethus ucumari	EN	2016		
			Niceforonia latens	VU	2016		
			Osornophryne percrassa	VU	2016		
			Pristimantis alalocophus	EN	2016		
			Pristimantis dorsopictus	VU	2016		
			Pristimantis gracilis	VU	2016		
			Pristimantis maculosus	VU	2017		
			Pristimantis racemus	VU	2019		
			Strabomantis necopinus	VU	2016		
		Arthropods	*Dysonia alipes*	VU	2019		
		Birds	*Bolborhynchus ferrugineifrons*	VU	2016		✔
			Chaetura pelagica	VU	2018		
			Chloropipo flavicapilla	VU	2016		
			Dacnis hartlaubi	VU	2016		✔
			Grallaria alleni	VU	2018		✔
			Grallaria milleri	VU	2016		✔
			Grallaria rufocinerea	VU	2016		✔
			Grallaricula cucullata	VU	2016		✔
			Hapalopsittaca amazonina	VU	2016		✔
			Hapalopsittaca fuertesi	CR	2018		✔

Country	KBA	Group	Species	IUCN Global Threat	Last IUCN assessment	Last IUCN record	GBIF records since 2010
			Hypopyrrhus pyrohypogaster	VU	2018		
			Leptosittaca branickii	VU	2016		✔
			Ognorhynchus icterotis	EN	2016		✔
			Oxypogon stuebelii	VU	2016		✔
			Patagioenas subvinacea	VU	2016		✔
			Penelope perspicax	EN	2016		✔
			Sericossypha albocristata	VU	2018		✔
			Spizaetus isidori	EN	2016		✔
			Tephrophilus wetmorei	VU	2018		
		Mammals	*Aotus lemurinus*	VU	2008		✔
			Leopardus tigrinus	VU	2016		
			Leptonycteris curasoae	VU	2015		
			Mazama rufina	VU	2015		
			Tapirus pinchaque	EN	2014		
			Tremarctos ornatus	VU	2016		
		Plants	*Cavendishia macrocephala*	VU	2018		
			Cedrela odorata	VU	2017		
			Guzmania goudotiana	VU	2018		
			Magnolia gilbertoi	EN	2007		
			Magnolia wolfii	CR	2007	2006	
			Plutarchia dichogama	EN	2018		
			Plutarchia minor	EN	2018		
			Plutarchia monantha	EN	2018		
			Plutarchia pubiflora	EN	2018		
			Plutarchia rigida	VU	2018		
			Puya ochroleuca	EN	2018		
			Themistoclesia mucronata	VU	2018		
			Themistoclesia recurva	VU	2018		
Colombia	Bosques Montanos del Sur de Antioquia	Amphibians	*Bolitoglossa tatamae*	EN	2017		
			Cochranella xanthocheridia	VU	2017		
			Colostethus thorntoni	VU	2019		
			Gastrotheca dendronastes	EN	2016		
			Hyloscirtus simmonsi	VU	2017		
			Nymphargus prasinus	VU	2016		
			Phyllobates bicolor	EN	2016		
			Pristimantis angustilineatus	EN	2016		
			Pristimantis calcaratus	VU	2016		✔
			Pristimantis ruedai	VU	2017		✔

Country	KBA	Group	Species	IUCN Global Threat	Last IUCN assessment	Last IUCN record	GBIF records since 2010
			Pristimantis suetus	VU	2016		
			Strabomantis cheiroplethus	EN	2016		
		Arthropods	*Dysonia alipes*	VU	2019		
			Miocora lugubris	VU	2014		
		Birds	*Atlapetes flaviceps*	EN	2016		✔
			Bangsia aureocincta	EN	2017		✔
			Bangsia melanochlamys	VU	2016		✔
			Chaetura pelagica	VU	2018		
			Chloropipo flavicapilla	VU	2016		✔
			Coeligena orina	CR	2017		✔
			Conopias cinchoneti	VU	2016		✔
			Geotrygon purpurata	EN	2016		
			Glaucidium nubicola	VU	2016		✔
			Henicorhina negreti	VU	2018		✔
			Hypopyrrhus pyrohypogaster	VU	2018		✔
			Patagioenas subvinacea	VU	2016		✔
			Penelope ortoni	EN	2018		✔
			Psarocolius cassini	VU	2019		✔
			Sericossypha albocristata	VU	2018		✔
			Spizaetus isidori	EN	2016		✔
		Mammals	*Aotus lemurinus*	VU	2008		✔
			Ateles fusciceps	EN	2020		
			Caenolestes convelatus	VU	2016		
			Leopardus tigrinus	VU	2016		✔
			Tayassu pecari	VU	2012		
			Thomasomys bombycinus	VU	2016		
			Tremarctos ornatus	VU	2016		✔
		Fish	*Ichthyoelephas longirostris*	VU	2014		
			Leporinus muyscorum	VU	2014		
			Pimelodus grosskopfii	CR	2014		
			Trichomycterus regani	VU	2014		
		Plants	*Cavendishia jardinensis*	CR	2018		
			Cavendishia macrocephala	VU	2018		
			Cavendishia nuda	CR	2018		
			Cedrela odorata	VU	2017		
			Magnolia jardinensis	CR	2015		✔
			Magnolia silvioi	EN	2007		
			Magnolia wolfii	CR	2007	2006	

Country	KBA	Group	Species	IUCN Global Threat	Last IUCN assessment	Last IUCN record	GBIF records since 2010
			Themistoclesia rostrata	VU	2018		
		Reptiles	*Anolis maculigula*	VU	2009		
			Atractus nicefori	VU	2013		✔
			Riama laevis	VU	2013		
Colombia	Cañón del Río Barbas y Bremen	Amphibians	*Andinobates bombetes*	VU	2016		✔
			Centrolene quindianum	VU	2016		✔
			Niceforonia latens	VU	2016		
			Pristimantis alalocophus	EN	2016		
			Pristimantis gracilis	VU	2016		
			Strabomantis necopinus	VU	2016		
		Arthropods	*Dysonia alipes*	VU	2019		
		Birds	*Chaetura pelagica*	VU	2018		
			Chloropipo flavicapilla	VU	2016		✔
			Dacnis hartlaubi	VU	2016		✔
			Grallaria alleni	VU	2018		✔
			Grallaria milleri	VU	2016		
			Grallaria rufocinerea	VU	2016		✔
			Grallaricula cucullata	VU	2016		
			Hapalopsittaca amazonina	VU	2016		
			Hypopyrrhus pyrohypogaster	VU	2018		
			Leptosittaca branickii	VU	2016		✔
			Ognorhynchus icterotis	EN	2016		
			Oxypogon stuebelii	VU	2016		
			Patagioenas subvinacea	VU	2016		✔
			Penelope perspicax	EN	2016		✔
			Sericossypha albocristata	VU	2018		
			Spizaetus isidori	EN	2016		
		Mammals	*Aotus lemurinus*	VU	2008		
			Leopardus tigrinus	VU	2016		
			Leptonycteris curasoae	VU	2015		
			Mazama rufina	VU	2015		
			Tapirus pinchaque	EN	2014		
			Tremarctos ornatus	VU	2016		
		Fish	*Ancistrus vericaucanus*	EN	2014		
		Plants	*Cavendishia macrocephala*	VU	2018		
			Cedrela odorata	VU	2017		
			Guzmania goudotiana	VU	2018		
			Magnolia gilbertoi	EN	2007		✔
			Magnolia wolfii	CR	2007	2006	
			Plutarchia minor	EN	2018		

Country	KBA	Group	Species	IUCN Global Threat	Last IUCN assessment	Last IUCN record	GBIF records since 2010
			Plutarchia monantha	EN	2018		
			Plutarchia pubiflora	EN	2018		
			Plutarchia rigida	VU	2018		
			Themistoclesia mucronata	VU	2018		
			Themistoclesia recurva	VU	2018		
Colombia	Cañón del Río Combeima	Amphibians	*Atelopus simulatus*	CR	2014	2003	
			Centrolene buckleyi	VU	2008		
			Hyloxalus vergeli	VU	2017		
			Nymphargus garciae	VU	2016		
			Pristimantis racemus	VU	2019		
		Arthropods	*Dysonia alipes*	VU	2019		
		Birds	*Anthocephala berlepschi*	VU	2019		✔
			Atlapetes flaviceps	EN	2016		✔
			Chaetura pelagica	VU	2018		
			Chloropipo flavicapilla	VU	2016		
			Grallaria milleri	VU	2016		✔
			Grallaria rufocinerea	VU	2016		✔
			Hapalopsittaca amazonina	VU	2016		
			Hapalopsittaca fuertesi	CR	2018		
			Hypopyrrhus pyrohypogaster	VU	2018		
			Leptosittaca branickii	VU	2016		✔
			Leptotila conoveri	EN	2016		✔
			Oxypogon stuebelii	VU	2016		
			Patagioenas subvinacea	VU	2016		✔
			Sericossypha albocristata	VU	2018		✔
			Spizaetus isidori	EN	2016		
			Tephrophilus wetmorei	VU	2018		
		Mammals	*Aotus lemurinus*	VU	2008		
			Leopardus tigrinus	VU	2016		
			Leptonycteris curasoae	VU	2015		
			Mazama rufina	VU	2015		
			Rhogeessa minutilla	VU	2016		
			Tapirus pinchaque	EN	2014		
			Tremarctos ornatus	VU	2016		
		Fish	*Bryconamericus tolimae*	VU	2014		
			Ichthyoelephas longirostris	VU	2014		
			Leporinus muyscorum	VU	2014		

Country	KBA	Group	Species	IUCN Global Threat	Last IUCN assessment	Last IUCN record	GBIF records since 2010
			Pseudoplatystoma magdaleniatum	EN	2014		
			Trichomycterus transandianus	VU	2014		
		Plants	*Cavendishia macrocephala*	VU	2018		
			Cedrela odorata	VU	2017		
			Plutarchia dichogama	EN	2018		
			Plutarchia minor	EN	2018		
			Plutarchia monantha	EN	2018		
			Plutarchia pubiflora	EN	2018		
			Plutarchia rigida	VU	2018		
			Puya ochroleuca	EN	2018		
			Themistoclesia mucronata	VU	2018		
			Themistoclesia recurva	VU	2018		
		Reptiles	*Podocnemis lewyana*	CR	2015		
Colombia	Cuenca del Río Toche	Amphibians	*Atelopus simulatus*	CR	2014	2003	
			Centrolene buckleyi	VU	2008		
			Niceforonia adenobrachia	EN	2016		
			Nymphargus garciae	VU	2016		
			Osornophryne percrassa	VU	2016		
			Pristimantis racemus	VU	2019		
			Pristimantis simoteriscus	EN	2016		
		Arthropods	*Dysonia alipes*	VU	2019		
		Birds	*Anthocephala berlepschi*	VU	2019		✔
			Atlapetes flaviceps	EN	2016		✔
			Bolborhynchus ferrugineifrons	VU	2016		
			Chaetura pelagica	VU	2018		✔
			Doliornis remseni	VU	2016		
			Grallaria milleri	VU	2016		✔
			Grallaria rufocinerea	VU	2016		✔
			Hapalopsittaca amazonina	VU	2016		
			Hapalopsittaca fuertesi	CR	2018		✔
			Hypopyrrhus pyrohypogaster	VU	2018		
			Leptosittaca branickii	VU	2016		✔
			Leptotila conoveri	EN	2016		✔
			Oxypogon stuebelii	VU	2016		
			Patagioenas subvinacea	VU	2016		
			Sericossypha albocristata	VU	2018		✔

Country	KBA	Group	Species	IUCN Global Threat	Last IUCN assessment	Last IUCN record	GBIF records since 2010
			Spizaetus isidori	EN	2016		
			Tephrophilus wetmorei	VU	2018		
		Mammals	*Aotus lemurinus*	VU	2008		
			Leopardus tigrinus	VU	2016		
			Leptonycteris curasoae	VU	2015		
			Mazama rufina	VU	2015		
			Rhogeessa minutilla	VU	2016		
			Tapirus pinchaque	EN	2014		
			Tremarctos ornatus	VU	2016		
		Fish	*Bryconamericus tolimae*	VU	2014		
			Trichomycterus transandianus	VU	2014		
		Plants	*Cavendishia macrocephala*	VU	2018		
			Cedrela odorata	VU	2017		
			Guzmania goudotiana	VU	2018		
			Magnolia gilbertoi	EN	2007		
			Plutarchia dichogama	EN	2018		
			Plutarchia minor	EN	2018		
			Plutarchia monantha	EN	2018		
			Plutarchia pubiflora	EN	2018		
			Plutarchia rigida	VU	2018		
			Puya ochroleuca	EN	2018		
			Themistoclesia mucronata	VU	2018		
			Themistoclesia recurva	VU	2018		
Colombia	Enclave Seco del Río Dagua	Amphibians	*Andinobates bombetes*	VU	2016		✔
			Gastrotheca dendronastes	EN	2016		
			Nymphargus prasinus	VU	2016		
			Pristimantis caprifer	CR	2016		
		Birds	*Aramides wolfi*	VU	2016		
			Cephalopterus penduliger	VU	2016		
			Chaetura pelagica	VU	2018		
			Chloropipo flavicapilla	VU	2016		
			Conopias cinchoneti	VU	2016		
			Crax rubra	VU	2016		
			Cryptoleucopteryx plumbea	VU	2016		
			Dacnis hartlaubi	VU	2016		
			Dysithamnus occidentalis	VU	2016		
			Geotrygon purpurata	EN	2016		

Country	KBA	Group	Species	IUCN Global Threat	Last IUCN assessment	Last IUCN record	GBIF records since 2010
			Glaucidium nubicola	VU	2016		
			Herpsilochmus axillaris	VU	2016		
			Micrastur plumbeus	VU	2016		
			Neomorphus radiolosus	EN	2016		
			Patagioenas subvinacea	VU	2016		✔
			Penelope perspicax	EN	2016		
			Spizaetus isidori	EN	2016		
		Mammals	*Ateles fusciceps*	EN	2020		
			Balantiopteryx infusca	VU	2014		
			Leopardus tigrinus	VU	2016		
			Mustela felipei	VU	2016		
			Myrmecophaga tridactyla	VU	2013		
		Fish	*Astroblepus ventralis*	VU	2014		
		Plants	*Cedrela odorata*	VU	2017		
			Magnolia calimaensis	CR	2007		
			Magnolia mahechae	EN	2007		
		Reptiles	*Riama laevis*	VU	2013		
			Synophis plectovertebralis	CR	2013		
Colombia	Finca la Betulia Reserva la Patasola	Amphibians	*Colostethus ucumari*	EN	2016		
			Niceforonia latens	VU	2016		
			Pristimantis alalocophus	EN	2016		
			Pristimantis gracilis	VU	2016		
			Pristimantis racemus	VU	2019		
			Strabomantis necopinus	VU	2016		
		Arthropods	*Dysonia alipes*	VU	2019		
		Birds	*Chaetura pelagica*	VU	2018		
			Chloropipo flavicapilla	VU	2016		✔
			Dacnis hartlaubi	VU	2016		
			Grallaria alleni	VU	2018		
			Grallaria milleri	VU	2016		✔
			Grallaria rufocinerea	VU	2016		
			Grallaricula cucullata	VU	2016		✔
			Hapalopsittaca amazonina	VU	2016		
			Hapalopsittaca fuertesi	CR	2018		
			Hypopyrrhus pyrohypogaster	VU	2018		
			Leptosittaca branickii	VU	2016		✔

Country	KBA	Group	Species	IUCN Global Threat	Last IUCN assessment	Last IUCN record	GBIF records since 2010
			Oxypogon stuebelii	VU	2016		
			Patagioenas subvinacea	VU	2016		
			Penelope perspicax	EN	2016		✔
			Sericossypha albocristata	VU	2018		✔
			Spizaetus isidori	EN	2016		
			Tephrophilus wetmorei	VU	2018		
		Mammals	*Aotus lemurinus*	VU	2008		
			Leopardus tigrinus	VU	2016		
			Leptonycteris curasoae	VU	2015		
			Mazama rufina	VU	2015		
			Tapirus pinchaque	EN	2014		
			Tremarctos ornatus	VU	2016		
		Plants	*Cavendishia macrocephala*	VU	2018		
			Cedrela odorata	VU	2017		
			Guzmania goudotiana	VU	2018		
			Magnolia gilbertoi	EN	2007		
			Magnolia wolfii	CR	2007	2006	
			Plutarchia dichogama	EN	2018		
			Plutarchia minor	EN	2018		
			Plutarchia monantha	EN	2018		
			Plutarchia pubiflora	EN	2018		
			Plutarchia rigida	VU	2018		
			Puya ochroleuca	EN	2018		
			Themistoclesia mucronata	VU	2018		
			Themistoclesia recurva	VU	2018		
Colombia	La Empalad a	Amphibians	*Bolitoglossa tatamae*	EN	2017		
			Cochranella xanthocheridia	VU	2017		
			Gastrotheca dendronastes	EN	2016		
			Hyloscirtus simmonsi	VU	2017		
			Pristimantis angustilineatus	EN	2016		
			Pristimantis calcaratus	VU	2016		
			Pristimantis juanchoi	VU	2016		
			Pristimantis polychrus	VU	2017		
			Pristimantis ptochus	EN	2018		
			Pristimantis ruedai	VU	2017		
			Silverstoneia erasmios	EN	2018		
		Birds	*Ara militaris*	VU	2016		
			Atlapetes flaviceps	EN	2016		✔

Country	KBA	Group	Species	IUCN Global Threat	Last IUCN assessment	Last IUCN record	GBIF records since 2010
			Bangsia aureocincta	EN	2017		✔
			Bangsia melanochlamys	VU	2016		✔
			Chaetura pelagica	VU	2018		
			Geotrygon purpurata	EN	2016		
			Glaucidium nubicola	VU	2016		
			Hypopyrrhus pyrohypogaster	VU	2018		✔
			Micrastur plumbeus	VU	2016		
			Spizaetus isidori	EN	2016		
		Mammals	*Aotus lemurinus*	VU	2008		
			Ateles fusciceps	EN	2020		
			Leopardus tigrinus	VU	2016		
			Mustela felipei	VU	2016		
			Tayassu pecari	VU	2012		
			Thomasomys bombycinus	VU	2016		
		Fish	*Ichthyoelephas longirostris*	VU	2014		
			Leporinus muyscorum	VU	2014		
			Pimelodus grosskopfii	CR	2014		
		Plants	*Cavendishia macrocephala*	VU	2018		
			Cedrela odorata	VU	2017		
			Magnolia wolfii	CR	2007	2006	
			Themistoclesia rostrata	VU	2018		
		Reptiles	*Riama laevis*	VU	2013		
Colombia	Páramos y Bosques Altoandinos de Génova	Amphibians	*Centrolene buckleyi*	VU	2008		
			Osornophryne percrassa	VU	2016		
			Pristimantis racemus	VU	2019		
		Birds	*Bolborhynchus ferrugineifrons*	VU	2016		
			Chaetura pelagica	VU	2018		
			Chloropipo flavicapilla	VU	2016		
			Doliornis remseni	VU	2016		
			Grallaria milleri	VU	2016		
			Grallaria rufocinerea	VU	2016		✔
			Grallaricula cucullata	VU	2016		
			Hapalopsittaca fuertesi	CR	2018		✔
			Leptosittaca branickii	VU	2016		
			Ognorhynchus icterotis	EN	2016		✔
			Patagioenas subvinacea	VU	2016		

Country	KBA	Group	Species	IUCN Global Threat	Last IUCN assessment	Last IUCN record	GBIF records since 2010
			Penelope perspicax	EN	2016		
			Sericossypha albocristata	VU	2018		
			Spizaetus isidori	EN	2016		
			Tephrophilus wetmorei	VU	2018		
		Mammals	*Aotus lemurinus*	VU	2008		
			Leopardus tigrinus	VU	2016		
			Leptonycteris curasoae	VU	2015		
			Mazama rufina	VU	2015		
			Tapirus pinchaque	EN	2014		
			Tremarctos ornatus	VU	2016		
		Plants	*Cavendishia macrocephala*	VU	2018		
			Cedrela odorata	VU	2017		
			Magnolia gilbertoi	EN	2007		
			Plutarchia dichogama	EN	2018		
			Plutarchia minor	EN	2018		
			Plutarchia monantha	EN	2018		
			Plutarchia rigida	VU	2018		
			Themistoclesia mucronata	VU	2018		
Colombia	Parque Natural Regional Páramo del Duende	Amphibians	*Andinobates bombetes*	VU	2016		
			Bolitoglossa hiemalis	VU	2018		
			Hyloscirtus simmonsi	VU	2017		
			Nymphargus prasinus	VU	2016		
			Pristimantis calcaratus	VU	2016		
			Pristimantis duende	VU	2018		
			Pristimantis juanchoi	VU	2016		
			Pristimantis silverstonei	VU	2016		
			Pristimantis xeniolum	VU	2018		
		Birds	*Ara militaris*	VU	2016		
			Bangsia melanochlamys	VU	2016		✔
			Chaetura pelagica	VU	2018		
			Chloropipo flavicapilla	VU	2016		
			Conopias cinchoneti	VU	2016		
			Cryptoleucopteryx plumbea	VU	2016		
			Dacnis hartlaubi	VU	2016		
			Dysithamnus occidentalis	VU	2016		
			Geotrygon purpurata	EN	2016		

Country	KBA	Group	Species	IUCN Global Threat	Last IUCN assessment	Last IUCN record	GBIF records since 2010
			Glaucidium nubicola	VU	2016		
			Herpsilochmus axillaris	VU	2016		
			Micrastur plumbeus	VU	2016		
			Patagioenas subvinacea	VU	2016		
			Penelope perspicax	EN	2016		
			Spizaetus isidori	EN	2016		✔
		Mammals	*Aotus lemurinus*	VU	2008		✔
			Ateles fusciceps	EN	2020		
			Leopardus tigrinus	VU	2016		
			Mustela felipei	VU	2016		✔
			Myrmecophaga tridactyla	VU	2013		✔
			Tayassu pecari	VU	2012		✔
			Tremarctos ornatus	VU	2016		✔
		Fish	*Genycharax tarpon*	VU	2014		
			Ichthyoelephas longirostris	VU	2014		
		Plants	*Cedrela odorata*	VU	2017		
			Magnolia calimaensis	CR	2007		
		Reptiles	*Riama laevis*	VU	2013		
Colombia	Región del Alto Calima	Amphibians	*Andinobates bombetes*	VU	2016		
			Gastrotheca cornuta	EN	2008		
			Gastrotheca dendronastes	EN	2016		
			Hyloxalus chocoensis	EN	2019		
			Nymphargus prasinus	VU	2016		
			Pristimantis caprifer	CR	2016		
		Birds	*Aramides wolfi*	VU	2016		
			Cephalopterus penduliger	VU	2016		
			Chaetura pelagica	VU	2018		
			Chloropipo flavicapilla	VU	2016		
			Conopias cinchoneti	VU	2016		
			Crax rubra	VU	2016		
			Cryptoleucopteryx plumbea	VU	2016		
			Dacnis hartlaubi	VU	2016		
			Dysithamnus occidentalis	VU	2016		
			Geotrygon purpurata	EN	2016		
			Glaucidium nubicola	VU	2016		
			Herpsilochmus axillaris	VU	2016		
			Micrastur plumbeus	VU	2016		

Country	KBA	Group	Species	IUCN Global Threat	Last IUCN assessment	Last IUCN record	GBIF records since 2010
			Neomorphus radiolosus	EN	2016		
			Patagioenas subvinacea	VU	2016		
			Penelope ortoni	EN	2018		
			Penelope perspicax	EN	2016		
			Spizaetus isidori	EN	2016		
		Mammals	*Ateles fusciceps*	EN	2020		
			Balantiopteryx infusca	VU	2014		
			Choeroniscus periosus	VU	2014		
			Leopardus tigrinus	VU	2016		
			Myrmecophaga tridactyla	VU	2013		
			Tremarctos ornatus	VU	2016		
		Fish	*Astroblepus heterodon*	VU	2014		
			Astroblepus ventralis	VU	2014		
			Gymnotus henni	VU	2014		
		Plants	*Cedrela odorata*	VU	2017		
			Magnolia calimaensis	CR	2007		
		Reptiles	*Riama laevis*	VU	2013		
Colombia	Reserva Hidrográfica, Forestal y Parque Ecológico de Río Blanco	Amphibians	*Centrolene quindianum*	VU	2016		
			Colostethus mertensi	VU	2016		
			Niceforonia adenobrachia	EN	2016		
			Niceforonia latens	VU	2016		
			Osornophryne percrassa	VU	2016		✔
			Pristimantis alalocophus	EN	2016		
			Pristimantis dorsopictus	VU	2016		
			Pristimantis gracilis	VU	2016		
			Pristimantis maculosus	VU	2017		
		Arthropods	*Dysonia alipes*	VU	2019		
		Birds	*Atlapetes flaviceps*	EN	2016		✔
			Bolborhynchus ferrugineifrons	VU	2016		✔
			Chaetura pelagica	VU	2018		
			Dacnis hartlaubi	VU	2016		
			Grallaria alleni	VU	2018		✔
			Grallaria milleri	VU	2016		✔
			Grallaria rufocinerea	VU	2016		✔
			Hapalopsittaca amazonina	VU	2016		✔
			Hapalopsittaca fuertesi	CR	2018		✔
			Ognorhynchus icterotis	EN	2016		✔
			Oxypogon stuebelii	VU	2016		

Country	KBA	Group	Species	IUCN Global Threat	Last IUCN assessment	Last IUCN record	GBIF records since 2010
			Patagioenas subvinacea	VU	2016		✔
			Sericossypha albocristata	VU	2018		✔
			Spizaetus isidori	EN	2016		
		Mammals	*Aotus lemurinus*	VU	2008		
			Leopardus tigrinus	VU	2016		
			Leptonycteris curasoae	VU	2015		
			Tremarctos ornatus	VU	2016		
		Plants	*Cavendishia macrocephala*	VU	2018		
			Cedrela odorata	VU	2017		
			Plutarchia minor	EN	2018		
			Plutarchia monantha	EN	2018		✔
			Plutarchia pubiflora	EN	2018		
			Plutarchia rigida	VU	2018		
			Puya ochroleuca	EN	2018		
			Themistoclesia mucronata	VU	2018		
			Themistoclesia recurva	VU	2018		
Colombia	Reserva Natural El Pangán	Amphibians	*Gastrotheca cornuta*	EN	2008		
			Nymphargus balionota	VU	2004		
			Pristimantis degener	EN	2016		
			Pristimantis hectus	VU	2018		
			Pristimantis scolodiscus	VU	2016		
			Rhaebo andinophrynoides	VU	2016		
		Birds	*Aramides wolfi*	VU	2016		
			Attila torridus	VU	2016		
			Bangsia flavovirens	VU	2018		
			Chaetocercus bombus	VU	2016		
			Chaetura pelagica	VU	2018		
			Cryptoleucopteryx plumbea	VU	2016		
			Dysithamnus occidentalis	VU	2016		
			Geotrygon purpurata	EN	2016		✔
			Glaucidium nubicola	VU	2016		✔
			Grallaria gigantea	VU	2018		
			Micrastur plumbeus	VU	2016		✔
			Neomorphus radiolosus	EN	2016		
			Odontophorus melanonotus	VU	2016		✔
			Ognorhynchus icterotis	EN	2016		
			Patagioenas subvinacea	VU	2016		✔

Country	**KBA**	**Group**	**Species**	**IUCN Global Threat**	**Last IUCN assessment**	**Last IUCN record**	**GBIF records since 2010**
			Penelope ortoni	EN	2018		✔
			Spizaetus isidori	EN	2016		
		Mammals	*Ateles fusciceps*	EN	2020		
			Choeroniscus periosus	VU	2014		
			Marmosa phaea	VU	2014		
			Mustela felipei	VU	2016		
			Myrmecophaga tridactyla	VU	2013		
			Tremarctos ornatus	VU	2016		
		Plants	*Cedrela odorata*	VU	2017		
		Reptiles	*Bothrocophias campbelli*	VU	2013		
			Enyalioides oshaughnessyi	VU	2015		
Colombia	Reserva Natural La Planada	Amphibians	*Centrolene ballux*	EN	2016		
			Centrolene scirtetes	EN	2018		
			Pristimantis apiculatus	EN	2016		
			Pristimantis celator	VU	2016		
			Pristimantis duellmani	VU	2004		
			Pristimantis eremitus	VU	2016		
			Pristimantis hectus	VU	2018		
			Pristimantis laticlavius	VU	2018		
			Pristimantis ocellatus	EN	2019		
			Pristimantis quinquagesimus	VU	2016		
			Pristimantis siopelus	VU	2016		
			Pristimantis sulculus	VU	2016		
			Rhaebo andinophrynoides	VU	2016		
			Rhaebo colomai	EN	2016		
			Strabomantis anatipes	VU	2016		
		Birds	*Attila torridus*	VU	2016		
			Chaetura pelagica	VU	2018		
			Conopias cinchoneti	VU	2016		
			Cryptoleucopteryx plumbea	VU	2016		
			Dysithamnus occidentalis	VU	2016		✔
			Geotrygon purpurata	EN	2016		
			Glaucidium nubicola	VU	2016		✔
			Grallaria alleni	VU	2018		
			Grallaria gigantea	VU	2018		
			Micrastur plumbeus	VU	2016		✔
			Neomorphus radiolosus	EN	2016		

Country	KBA	Group	Species	IUCN Global Threat	Last IUCN assessment	Last IUCN record	GBIF records since 2010
			Odontophorus melanonotus	VU	2016		✔
			Ognorhynchus icterotis	EN	2016		
			Patagioenas subvinacea	VU	2016		✔
			Penelope ortoni	EN	2018		
			Spizaetus isidori	EN	2016		
		Mammals	*Aotus lemurinus*	VU	2008		
			Ateles fusciceps	EN	2020		
			Caenolestes convelatus	VU	2016		
			Marmosa phaea	VU	2014		
			Mustela felipei	VU	2016		
			Tremarctos ornatus	VU	2016		
		Plants	*Cedrela odorata*	VU	2017		
Colombia	Reserva Natural Río Ñambí	Amphibians	*Gastrotheca cornuta*	EN	2008		
			Nymphargus balionota	VU	2004		
			Pristimantis degener	EN	2016		
			Pristimantis hectus	VU	2018		
			Pristimantis loustes	EN	2016		
			Pristimantis scolodiscus	VU	2016		
			Rhaebo andinophrynoides	VU	2016		
			Rhaebo colomai	EN	2016		
			Strabomantis anatipes	VU	2016		
		Birds	*Aramides wolfi*	VU	2016		
			Attila torridus	VU	2016		
			Bangsia flavovirens	VU	2018		
			Chaetocercus bombus	VU	2016		
			Chaetura pelagica	VU	2018		
			Cryptoleucopteryx plumbea	VU	2016		✔
			Dacnis berlepschi	VU	2016		
			Dysithamnus occidentalis	VU	2016		
			Geotrygon purpurata	EN	2016		
			Glaucidium nubicola	VU	2016		
			Grallaria gigantea	VU	2018		
			Micrastur plumbeus	VU	2016		✔
			Neomorphus radiolosus	EN	2016		
			Odontophorus melanonotus	VU	2016		✔
			Ognorhynchus icterotis	EN	2016		
			Patagioenas subvinacea	VU	2016		✔
			Penelope ortoni	EN	2018		✔

Country	KBA	Group	Species	IUCN Global Threat	Last IUCN assessment	Last IUCN record	GBIF records since 2010
			Spizaetus isidori	EN	2016		
		Mammals	*Ateles fusciceps*	EN	2020		
			Choeroniscus periosus	VU	2014		
			Marmosa phaea	VU	2014		
			Mustela felipei	VU	2016		
		Plants	*Cedrela odorata*	VU	2017		
		Reptiles	*Bothrocophias campbelli*	VU	2013		
			Enyalioides oshaughnessyi	VU	2015		
Colombia	Reservas Comunitarias de Roncesvalles	Amphibians	*Centrolene buckleyi*	VU	2008		
			Nymphargus garciae	VU	2016		
			Osornophryne percrassa	VU	2016		✔
			Pristimantis racemus	VU	2019		
		Birds	*Anthocephala berlepschi*	VU	2019		
			Atlapetes flaviceps	EN	2016		✔
			Bolborhynchus ferrugineifrons	VU	2016		
			Chaetura pelagica	VU	2018		
			Doliornis remseni	VU	2016		
			Grallaria milleri	VU	2016		
			Grallaria rufocinerea	VU	2016		
			Hapalopsittaca amazonina	VU	2016		
			Hapalopsittaca fuertesi	CR	2018		✔
			Leptosittaca branickii	VU	2016		✔
			Ognorhynchus icterotis	EN	2016		✔
			Patagioenas subvinacea	VU	2016		✔
			Sericossypha albocristata	VU	2018		✔
			Spizaetus isidori	EN	2016		
			Tephrophilus wetmorei	VU	2018		✔
		Mammals	*Aotus lemurinus*	VU	2008		
			Leopardus tigrinus	VU	2016		✔
			Leptonycteris curasoae	VU	2015		
			Mazama rufina	VU	2015		
			Tapirus pinchaque	EN	2014		
			Tremarctos ornatus	VU	2016		
		Plants	*Cedrela odorata*	VU	2017		
			Magnolia gilbertoi	EN	2007		
			Plutarchia dichogama	EN	2018		
			Plutarchia minor	EN	2018		
			Plutarchia monantha	EN	2018		

Country	KBA	Group	Species	IUCN Global Threat	Last IUCN assessment	Last IUCN record	GBIF records since 2010
			Plutarchia pubiflora	EN	2018		
			Plutarchia rigida	VU	2018		
			Themistoclesia mucronata	VU	2018		
			Tillandsia cuatrecasasii	CR	2018		
		Reptiles	*Riama columbiana*	EN	2013		
Colombia	Serranía de los Paraguas	Amphibians	*Andinobates bombetes*	VU	2016		✔
			Centrolene heloderma	VU	2016	1996	
			Cochranella megistra	EN	2016		
			Colostethus agilis	EN	2016		
			Gastrotheca cornuta	EN	2008		
			Gastrotheca dendronastes	EN	2016		
			Hyloscirtus simmonsi	VU	2017		
			Hyloxalus chocoensis	EN	2019		
			Hyloxalus fascianigrus	VU	2016		
			Nymphargus armatus	CR	2016		
			Nymphargus prasinus	VU	2016		
			Nymphargus ruizi	VU	2016		
			Phyllobates bicolor	EN	2016		✔
			Pristimantis angustilineatus	EN	2016		
			Pristimantis calcaratus	VU	2016		
			Pristimantis chrysops	CR	2016		
			Pristimantis deinops	CR	2016		
			Pristimantis kelephus	CR	2016		
			Pristimantis molybrignus	CR	2016	1999	
			Pristimantis myops	EN	2018		
			Pristimantis phalarus	EN	2016		
			Pristimantis polychrus	VU	2017		
			Pristimantis ptochus	EN	2018		
			Pristimantis quantus	EN	2016		
			Pristimantis ruedai	VU	2017		
			Pristimantis signifer	CR	2017		
			Pristimantis silverstonei	VU	2016		✔
			Pristimantis xylochobates	CR	2016		
			Strabomantis cheiroplethus	EN	2016		

Country	KBA	Group	Species	IUCN Global Threat	Last IUCN assessment	Last IUCN record	GBIF records since 2010
		Birds	*Ara militaris*	VU	2016		
			Aramides wolfi	VU	2016		
			Bangsia aureocincta	EN	2017		✔
			Bangsia melanochlamys	VU	2016		✔
			Chaetura pelagica	VU	2018		
			Chloropipo flavicapilla	VU	2016		✔
			Conopias cinchoneti	VU	2016		✔
			Crax rubra	VU	2016		
			Cryptoleucopteryx plumbea	VU	2016		
			Dysithamnus occidentalis	VU	2016		✔
			Geotrygon purpurata	EN	2016		
			Glaucidium nubicola	VU	2016		✔
			Grallaricula cucullata	VU	2016		
			Henicorhina negreti	VU	2018		✔
			Herpsilochmus axillaris	VU	2016		✔
			Hypopyrrhus pyrohypogaster	VU	2018		
			Micrastur plumbeus	VU	2016		
			Patagioenas subvinacea	VU	2016		✔
			Spizaetus isidori	EN	2016		✔
		Mammals	*Aotus lemurinus*	VU	2008		
			Ateles fusciceps	EN	2020		
			Caenolestes convelatus	VU	2016		
			Choeroniscus periosus	VU	2014		
			Leopardus tigrinus	VU	2016		
			Mustela felipei	VU	2016		
			Myrmecophaga tridactyla	VU	2013		
			Tayassu pecari	VU	2012		
			Thomasomys bombycinus	VU	2016		
			Tremarctos ornatus	VU	2016		
		Fish	*Apteronotus spurrellii*	VU	2014		
			Astroblepus heterodon	VU	2014		
			Astroblepus ventralis	VU	2014		
			Chaetostoma palmeri	EN	2014		
			Genycharax tarpon	VU	2014		
			Ichthyoelephas longirostris	VU	2014		
			Leporinus muyscorum	VU	2014		

Country	KBA	Group	Species	IUCN Global Threat	Last IUCN assessment	Last IUCN record	GBIF records since 2010
			Pimelodella macrocephala	VU	2014		
			Pimelodus grosskopfii	CR	2014		
		Plants	*Cedrela odorata*	VU	2017		
		Reptiles	*Riama laevis*	VU	2013		
Colombia	Serranía del Pinche	Amphibians	*Centrolene buckleyi*	VU	2008		
			Nymphargus balionota	VU	2004		
			Pristimantis duellmani	VU	2004		
		Birds	*Chaetura pelagica*	VU	2018		
			Conopias cinchoneti	VU	2016		
			Cryptoleucopteryx plumbea	VU	2016		
			Dysithamnus occidentalis	VU	2016		
			Eriocnemis isabellae	CR	2018		
			Eriocnemis mirabilis	EN	2017		
			Geotrygon purpurata	EN	2016		
			Glaucidium nubicola	VU	2016		
			Micrastur plumbeus	VU	2016		
			Neomorphus radiolosus	EN	2016		
			Ognorhynchus icterotis	EN	2016		
			Patagioenas subvinacea	VU	2016		
			Penelope ortoni	EN	2018		
			Spizaetus isidori	EN	2016		
		Mammals	*Alouatta palliata*	VU	2015		
			Ateles fusciceps	EN	2020		
			Choeroniscus periosus	VU	2014		
			Mustela felipei	VU	2016		
			Myrmecophaga tridactyla	VU	2013		
		Plants	*Cedrela odorata*	VU	2017		
Ecuador	1 km west of Loja	Amphibians	*Atelopus podocarpus*	CR	2018	1994	
			Centrolene buckleyi	VU	2008		
			Gastrotheca lojana	VU	2016		
			Rhinella amabilis	CR	2006		
			Telmatobius vellardi	CR	2008	1987	
		Arthropods	*Parides phalaecus*	VU	2019		
		Birds	*Chaetocercus bombus*	VU	2016		
			Chaetura pelagica	VU	2018		
			Spizaetus isidori	EN	2016		
		Plants	*Cedrela odorata*	VU	2017		

Country	KBA	Group	Species	IUCN Global Threat	Last IUCN assessment	Last IUCN record	GBIF records since 2010
			Ceratostema lanceolatum	EN	2018		
			Isoetes ecuadoriensis	VU	2014		
			Oreanthes fragilis	VU	2018		
			Puya aequatorialis	VU	2018		
			Puya parviflora	EN	2018		
		Reptiles	*Atractus carrioni*	EN	2014		
			Micrurus catamayensis	EN	2014		
			Riama vespertina	VU	2018		
			Stenocercus festae	VU	2014		
			Stenocercus ornatus	VU	2014		
Ecuador	Abra de Zamora	Amphibians	*Atelopus nepiozomus*	EN	2016		
			Atelopus podocarpus	CR	2018	1994	
			Centrolene buckleyi	VU	2008		
			Gastrotheca lojana	VU	2016		
			Gastrotheca psychrophila	EN	2016		
			Hyloxalus anthracinus	CR	2004		
			Pristimantis atratus	EN	2004		
			Pristimantis balionotus	EN	2004		
			Pristimantis orestes	EN	2004		
			Pristimantis percultus	EN	2004		
			Pristimantis proserpens	VU	2017		
			Pristimantis vidua	EN	2004		
			Telmatobius cirrhacelis	CR	2008	1981	
		Arthropods	*Parides phalaecus*	VU	2019		
		Birds	*Agriornis albicauda*	VU	2016		
			Chaetocercus bombus	VU	2016		
			Chaetura pelagica	VU	2018		
			Galbula pastazae	VU	2016		
			Hapalopsittaca pyrrhops	VU	2016		
			Pyrrhura albipectus	VU	2016		
			Spizaetus isidori	EN	2016		
			Tephrophilus wetmorei	VU	2018		
			Touit stictopterus	VU	2016		
		Mammals	*Aotus lemurinus*	VU	2008		
			Caenolestes sangay	VU	2016		
			Mazama rufina	VU	2015		
			Tapirus pinchaque	EN	2014		
			Tremarctos ornatus	VU	2016		
		Plants	*Cedrela odorata*	VU	2017		

Country	KBA	Group	Species	IUCN Global Threat	Last IUCN assessment	Last IUCN record	GBIF records since 2010
			Ceratostema lanceolatum	EN	2018		
			Isoetes ecuadoriensis	VU	2014		
			Macleania mollis	VU	2018		
			Oreanthes ecuadorensis	EN	2018		
			Oreanthes fragilis	VU	2018		
			Oreanthes glanduliferus	EN	2018		
			Oreanthes hypogaeus	EN	2018		
			Orthaea oriens	VU	2018		
			Puya aequatorialis	VU	2018		
			Puya exigua	EN	2018		
			Puya maculata	VU	2018		
			Puya obconica	EN	2018		
		Reptiles	*Atractus carrioni*	EN	2014		
			Bothrops lojanus	VU	2019		
			Macropholidus annectens	EN	2014		
			Stenocercus festae	VU	2014		
			Stenocercus ornatus	VU	2014		
Ecuador	Acanamá - Guashapamba-Aguirre	Amphibians	*Gastrotheca lojana*	VU	2016		
			Hyloxalus vertebralis	CR	2004		
			Pristimantis orestes	EN	2004		
		Birds	*Agriornis albicauda*	VU	2016		
			Atlapetes pallidiceps	EN	2016		
			Chaetocercus bombus	VU	2016		
			Chaetura pelagica	VU	2018		
			Hapalopsittaca pyrrhops	VU	2016		
			Spizaetus isidori	EN	2016		
		Mammals	*Thomasomys hudsoni*	VU	2016		
			Thomasomys pyrrhonotus	VU	2008		
		Plants	*Cedrela odorata*	VU	2017		
			Oreanthes fragilis	VU	2018		
			Puya aequatorialis	VU	2018		
			Puya roseana	CR	2018		
		Reptiles	*Bothrops lojanus*	VU	2019		
			Dipsas oligozonata	VU	2018		
			Riama vespertina	VU	2018		
			Stenocercus festae	VU	2014		
			Stenocercus rhodomelas	VU	2014		
Ecuador	Alrededores de Amaluza	Amphibians	*Atelopus boulengeri*	CR	2004		
			Atelopus nepiozomus	EN	2016		
			Nymphargus cochranae	VU	2008		

Country	KBA	Group	Species	IUCN Global Threat	Last IUCN assessment	Last IUCN record	GBIF records since 2010
			Pristimantis atratus	EN	2004		
			Pristimantis baryecuus	EN	2004		
			Pristimantis cryophilius	EN	2004		
			Pristimantis nigrogriseus	VU	2004		
			Pristimantis proserpens	VU	2017		
			Pristimantis pycnodermis	EN	2004		
			Telmatobius niger	CR	2008	1994	
		Arthropods	*Heteropodagrion nigripes*	VU	2017		
		Birds	*Agriornis albicauda*	VU	2016		
			Chaetocercus bombus	VU	2016		
			Chaetura pelagica	VU	2018		
			Conopias cinchoneti	VU	2016		
			Cranioleuca curtata	VU	2016		
			Doliornis remseni	VU	2016		
			Dysithamnus leucostictus	VU	2016		
			Galbula pastazae	VU	2016		
			Hapalopsittaca pyrrhops	VU	2016		
			Herpsilochmus axillaris	VU	2016		
			Patagioenas subvinacea	VU	2016		
			Phlogophilus hemileucurus	VU	2016		
			Ramphastos culminatus	VU	2016		
			Sericossypha albocristata	VU	2018		✔
			Spizaetus isidori	EN	2016		✔
			Tephrophilus wetmorei	VU	2018		
			Thamnophilus tenuepunctatus	VU	2016		✔
			Tinamus tao	VU	2018		
			Touit huetii	VU	2016		
			Touit stictopterus	VU	2016		
		Mammals	*Aotus lemurinus*	VU	2008		
			Mazama rufina	VU	2015		
			Tapirus pinchaque	EN	2014		✔
			Tapirus terrestris	VU	2018		
			Thomasomys hudsoni	VU	2016		
			Tremarctos ornatus	VU	2016		
		Plants	*Baccharis hieronymi*	VU	2014		
			Cavendishia orthosepala	EN	2018		
			Cedrela odorata	VU	2017		
			Ceratostema nubigena	EN	2018		

Country	KBA	Group	Species	IUCN Global Threat	Last IUCN assessment	Last IUCN record	GBIF records since 2010
			Costus zamoranus	EN	2015		
			Diogenesia gracilipes	CR	2018		
			Orthaea oriens	VU	2018		
			Puya brackeana	CR	2018		
			Puya maculata	VU	2018		
			Puya navarroana	EN	2018		
			Themistoclesia campii	CR	2018		
		Reptiles	*Enyalioides rubrigularis*	VU	2014		
			Riama anatoloros	VU	2014		
			Riama petrorum	EN	2009		
			Riama stigmatoral	VU	2014		
			Stenocercus festae	VU	2014		
			Trilepida anthracina	VU	2018		
Ecuador	Bosque Protector Los Cedros	Amphibians	*Atelopus coynei*	CR	2004		
			Gastrotheca cornuta	EN	2008		
			Hyloxalus toachi	EN	2004		
			Pristimantis crucifer	VU	2004		✔
			Pristimantis floridus	VU	2004		
			Pristimantis hectus	VU	2018		
			Pristimantis laticlavius	VU	2018		
			Pristimantis muricatus	VU	2004		
			Pristimantis mutabilis	EN	2015		
			Pristimantis ornatissimus	VU	2004		
			Pristimantis scolodiscus	VU	2016		
			Rhaebo caeruleostictus	EN	2004		
		Birds	*Aramides wolfi*	VU	2016		
			Attila torridus	VU	2016		
			Bangsia flavovirens	VU	2018		
			Cephalopterus penduliger	VU	2016		✔
			Chaetocercus bombus	VU	2016		✔
			Chaetura pelagica	VU	2018		
			Cryptoleucopteryx plumbea	VU	2016		
			Dacnis berlepschi	VU	2016		
			Geotrygon purpurata	EN	2016		
			Glaucidium nubicola	VU	2016		
			Grallaria alleni	VU	2018		
			Grallaria gigantea	VU	2018		
			Micrastur plumbeus	VU	2016		✔

Country	KBA	Group	Species	IUCN Global Threat	Last IUCN assessment	Last IUCN record	GBIF records since 2010
			Neomorphus radiolosus	EN	2016		✔
			Odontophorus melanonotus	VU	2016		✔
			Ognorhynchus icterotis	EN	2016		
			Pachyramphus spodiurus	VU	2019		
			Patagioenas subvinacea	VU	2016		✔
			Penelope ortoni	EN	2018		✔
			Spizaetus isidori	EN	2016		✔
		Mammals	*Alouatta palliata*	VU	2015		✔
			Ateles fusciceps	EN	2020		
			Marmosa phaea	VU	2014		
			Mindomys hammondi	EN	2016		
		Plants	*Cedrela odorata*	VU	2017		
			Macleania ericae	VU	2018		
		Reptiles	*Atractus occidentalis*	EN	2014		
			Atractus paucidens	VU	2014		
			Bothrocophias campbelli	VU	2013		✔
			Echinosaura keyi	VU	2016		
			Enyalioides oshaughnessyi	VU	2015		
			Lepidoblepharis conolepis	EN	2016		
Ecuador	Bosque Protector Moya-Molón	Amphibians	*Atelopus bomolochos*	CR	2016	2002	
			Atelopus nepiozomus	EN	2016		
			Hyloxalus anthracinus	CR	2004		
			Hyloxalus vertebralis	CR	2004		
		Birds	*Agriornis albicauda*	VU	2016		
			Chaetocercus bombus	VU	2016		
			Chaetura pelagica	VU	2018		
			Doliornis remseni	VU	2016		
			Hapalopsittaca pyrrhops	VU	2016		
			Spizaetus isidori	EN	2016		
			Tephrophilus wetmorei	VU	2018		
		Mammals	*Aotus lemurinus*	VU	2008		
			Mazama rufina	VU	2015		
			Thomasomys hudsoni	VU	2016		
			Tremarctos ornatus	VU	2016		
		Plants	*Baccharis hieronymi*	VU	2014		
			Cedrela odorata	VU	2017		
			Orthaea oriens	VU	2018		
			Plutarchia ecuadorensis	EN	2018		

Country	KBA	Group	Species	IUCN Global Threat	Last IUCN assessment	Last IUCN record	GBIF records since 2010
			Puya brackeana	CR	2018		
			Puya maculata	VU	2018		
			Puya navarroana	EN	2018		
			Puya nutans	EN	2018		
		Reptiles	*Stenocercus festae*	VU	2014		
Ecuador	Cordillera de Huacamayos-San Isidro-Sierra Azul	Amphibians	*Allobates kingsburyi*	EN	2004		
			Atelopus petersi	CR	2008	1996	
			Atelopus spumarius	VU	2008		
			Centrolene buckleyi	VU	2008		
			Centrolene huilense	EN	2018		
			Hyloscirtus psarolaimus	VU	2016		
			Hyloscirtus staufferorum	EN	2016		
			Hyloscirtus torrenticola	VU	2016		
			Nymphargus cochranae	VU	2008		
			Nymphargus siren	VU	2008		
			Osornophryne antisana	EN	2004		
			Osornophryne guacamayo	EN	2008		✔
			Pristimantis colonensis	VU	2016		
			Pristimantis eriphus	VU	2016		
			Pristimantis festae	EN	2004		
			Pristimantis gladiator	VU	2017		
			Pristimantis inusitatus	VU	2004		
			Pristimantis leucopus	EN	2018		
			Pristimantis nigrogriseus	VU	2004		
			Pristimantis prolatus	EN	2004		
			Pristimantis pugnax	CR	2016		
			Pristimantis rubicundus	EN	2004		
		Arthropods	*Ontherus hadros*	VU	2013		
		Birds	*Agamia agami*	VU	2016		
			Agriornis albicauda	VU	2016		
			Ara militaris	VU	2016		
			Chaetocercus bombus	VU	2016		
			Chaetura pelagica	VU	2018		✔
			Chloropipo flavicapilla	VU	2016		
			Conopias cinchoneti	VU	2016		✔
			Cranioleuca curtata	VU	2016		✔

Country	KBA	Group	Species	IUCN Global Threat	Last IUCN assessment	Last IUCN record	GBIF records since 2010
			Dysithamnus leucostictus	VU	2016		✔
			Dysithamnus occidentalis	VU	2016		✔
			Galbula pastazae	VU	2016		✔
			Grallaria alleni	VU	2018		✔
			Grallaria gigantea	VU	2018		✔
			Heliodoxa gularis	VU	2016		
			Herpsilochmus axillaris	VU	2016		
			Patagioenas subvinacea	VU	2016		✔
			Phlogophilus hemileucurus	VU	2016		
			Ramphastos culminatus	VU	2016		
			Sericossypha albocristata	VU	2018		✔
			Spizaetus isidori	EN	2016		✔
			Thamnophilus tenuepunctatus	VU	2016		✔
			Tinamus osgoodi	VU	2018		
			Tinamus tao	VU	2018		
			Touit huetii	VU	2016		
			Touit stictopterus	VU	2016		
			Zimmerius cinereicapilla	VU	2016		
		Mammals	*Aotus lemurinus*	VU	2008		
			Mazama rufina	VU	2015		
			Mustela felipei	VU	2016		
			Neomicroxus latebricola	EN	2016		
			Pteronura brasiliensis	EN	2014		
			Tapirus pinchaque	EN	2014		✔
			Tapirus terrestris	VU	2018		✔
			Tayassu pecari	VU	2012		✔
			Thomasomys ucucha	VU	2016		
			Tremarctos ornatus	VU	2016		
		Plants	*Cedrela odorata*	VU	2017		
			Ceratostema megabracteatum	EN	2018		
			Ceratostema nodosum	VU	2018		
			Ceratostema silvicola	EN	2018		
			Thibaudia lateriflora	EN	2018		
		Reptiles	*Atractus duboisi*	EN	2014		
			Morunasaurus annularis	VU	2014		
			Riama anatoloros	VU	2014		
			Riama orcesi	VU	2014		
			Riama raneyi	VU	2014		
Ecuador	Corredor Awacachi	Amphibians	*Agalychnis litodryas*	VU	2004		
			Atelopus coynei	CR	2004		

Country	KBA	Group	Species	IUCN Global Threat	Last IUCN assessment	Last IUCN record	GBIF records since 2010
			Atelopus elegans	EN	2019		
			Gastrotheca cornuta	EN	2008		
			Hyloxalus toachi	EN	2004		
			Pristimantis colomai	VU	2016		
			Pristimantis crucifer	VU	2004		
			Pristimantis degener	EN	2016		
			Pristimantis hectus	VU	2018		
			Pristimantis ornatissimus	VU	2004		✔
			Pristimantis rosadoi	VU	2016		
			Pristimantis scolodiscus	VU	2016		
			Pristimantis tenebrionis	EN	2004		
		Birds	*Ara ambiguus*	EN	2016		
			Aramides wolfi	VU	2016		
			Attila torridus	VU	2016		
			Bangsia flavovirens	VU	2018		
			Cephalopterus penduliger	VU	2016		
			Chaetocercus bombus	VU	2016		
			Chaetura pelagica	VU	2018		
			Crax rubra	VU	2016		
			Cryptoleucopteryx plumbea	VU	2016		
			Dacnis berlepschi	VU	2016		
			Geotrygon purpurata	EN	2016		
			Glaucidium nubicola	VU	2016		
			Micrastur plumbeus	VU	2016		
			Neomorphus radiolosus	EN	2016		
			Odontophorus melanonotus	VU	2016		
			Ognorhynchus icterotis	EN	2016		
			Ortalis erythroptera	VU	2018		
			Patagioenas subvinacea	VU	2016		✔
			Penelope ortoni	EN	2018		
			Spizaetus isidori	EN	2016		
		Mammals	*Alouatta palliata*	VU	2015		
			Ateles fusciceps	EN	2020		
			Cebus aequatorialis	CR	2015		
			Choeroniscus periosus	VU	2014		
			Marmosa phaea	VU	2014		
		Fish	*Hypostomus annectens*	VU	2014		

Country	KBA	Group	Species	IUCN Global Threat	Last IUCN assessment	Last IUCN record	GBIF records since 2010
			Pseudochalceus longianalis	VU	2014		
			Sturisomatichthys frenatus	CR	2014		
		Plants	*Cedrela odorata*	VU	2017		
		Reptiles	*Anolis parilis*	VU	2014		
			Atractus paucidens	VU	2014		
			Bothrocophias campbelli	VU	2013		
			Corallus blombergi	EN	2013		
			Echinosaura keyi	VU	2016		
			Enyalioides oshaughnessyi	VU	2015		
			Lepidoblepharis grandis	VU	2016		
			Synophis bicolor	EN	2013		
Ecuador	Gualaceo -Limón Indanza	Amphibians	*Centrolene buckleyi*	VU	2008		
			Gastrotheca litonedis	EN	2016		
			Hyloxalus anthracinus	CR	2004		
			Hyloxalus vertebralis	CR	2004		
			Pristimantis cryophilius	EN	2004		
			Pristimantis pycnodermis	EN	2004		
			Telmatobius niger	CR	2008	1994	
		Birds	*Agriornis albicauda*	VU	2016		
			Chaetocercus bombus	VU	2016		
			Chaetura pelagica	VU	2018		
			Doliornis remseni	VU	2016		
			Hapalopsittaca pyrrhops	VU	2016		
			Spizaetus isidori	EN	2016		
			Tephrophilus wetmorei	VU	2018		✔
			Touit stictopterus	VU	2016		
		Mammals	*Aotus lemurinus*	VU	2008		
			Mazama rufina	VU	2015		
			Thomasomys hudsoni	VU	2016		
			Tremarctos ornatus	VU	2016		
		Plants	*Baccharis hieronymi*	VU	2014		
			Cavendishia orthosepala	EN	2018		
			Cedrela odorata	VU	2017		
			Ceratostema nubigena	EN	2018		
			Orthaea oriens	VU	2018		
			Plutarchia ecuadorensis	EN	2018		
			Puya brackeana	CR	2018		
			Puya maculata	VU	2018		
			Puya navarroana	EN	2018		

Country	KBA	Group	Species	IUCN Global Threat	Last IUCN assessment	Last IUCN record	GBIF records since 2010
			Themistoclesia campii	CR	2018		
		Reptiles	*Riama stigmatoral*	VU	2014		
			Stenocercus festae	VU	2014		
Ecuador	Intag-Toisán	Amphibians	*Atelopus coynei*	CR	2004		
			Colostethus jacobuspetersi	CR	2004	1960s	
			Gastrotheca plumbea	VU	2004		✔
			Hyloscirtus criptico	EN	2016		
			Pristimantis apiculatus	EN	2016		
			Pristimantis calcarulatus	VU	2004		
			Pristimantis celator	VU	2016		
			Pristimantis crucifer	VU	2004		
			Pristimantis duellmani	VU	2004		
			Pristimantis eremitus	VU	2016		
			Pristimantis hectus	VU	2018		✔
			Pristimantis laticlavius	VU	2018		
			Pristimantis muricatus	VU	2004		
			Pristimantis ocellatus	EN	2019		
			Pristimantis pteridophilus	EN	2004		✔
			Pristimantis pyrrhomerus	EN	2004		
			Pristimantis quinquagesimus	VU	2016		
			Pristimantis rosadoi	VU	2016		
			Pristimantis surdus	EN	2004		
			Pristimantis vertebralis	VU	2004		
		Birds	*Ara ambiguus*	EN	2016		
			Attila torridus	VU	2016		
			Chaetocercus bombus	VU	2016		✔
			Chaetura pelagica	VU	2018		
			Conopias cinchoneti	VU	2016		
			Cryptoleucopteryx plumbea	VU	2016		
			Eriocnemis nigrivestis	CR	2016		
			Geotrygon purpurata	EN	2016		
			Glaucidium nubicola	VU	2016		
			Grallaria alleni	VU	2018		
			Grallaria gigantea	VU	2018		✔
			Grallaria rufocinerea	VU	2016		

Country	KBA	Group	Species	IUCN Global Threat	Last IUCN assessment	Last IUCN record	GBIF records since 2010
			Micrastur plumbeus	VU	2016		
			Neomorphus radiolosus	EN	2016		
			Odontophorus melanonotus	VU	2016		✔
			Ognorhynchus icterotis	EN	2016		
			Patagioenas subvinacea	VU	2016		
			Penelope ortoni	EN	2018		
			Spizaetus isidori	EN	2016		✔
		Mammals	*Alouatta palliata*	VU	2015		
			Ateles fusciceps	EN	2020		
			Caenolestes convelatus	VU	2016		
			Marmosa phaea	VU	2014		
			Mindomys hammondi	EN	2016		
			Mustela felipei	VU	2016		
			Neomicroxus latebricola	EN	2016		
		Fish	*Astroblepus ubidiai*	CR	2014		
			Pseudochalceus longianalis	VU	2014		
		Plants	*Cedrela odorata*	VU	2017		
			Macleania ericae	VU	2018		
			Sphyrospermum sodiroi	VU	2018		
		Reptiles	*Atractus occidentalis*	EN	2014		
			Atractus paucidens	VU	2014		
			Bothrocophias campbelli	VU	2013		
			Dipsas elegans	VU	2014		✔
			Echinosaura keyi	VU	2016		
			Enyalioides oshaughnessyi	VU	2015		
			Lepidoblepharis conolepis	EN	2016		
			Riama colomaromani	EN	2014		
			Riama simotera	EN	2013		
			Riama unicolor	VU	2018		
			Stenocercus varius	EN	2014		
Ecuador	Los Bancos-Milpe	Amphibians	*Gastrotheca cornuta*	EN	2008		
			Hyloxalus toachi	EN	2004		
			Pristimantis crenunguis	EN	2004		
			Pristimantis crucifer	VU	2004		
			Pristimantis floridus	VU	2004		
			Pristimantis laticlavius	VU	2018		
			Pristimantis muricatus	VU	2004		

Country	KBA	Group	Species	IUCN Global Threat	Last IUCN assessment	Last IUCN record	GBIF records since 2010
			Pristimantis ornatissimus	VU	2004		
			Pristimantis rosadoi	VU	2016		
			Rhaebo caeruleostictus	EN	2004		
			Strabomantis helonotus	CR	2004		
		Birds	*Aramides wolfi*	VU	2016		
			Attila torridus	VU	2016		
			Bangsia flavovirens	VU	2018		✔
			Cephalopterus penduliger	VU	2016		✔
			Chaetocercus bombus	VU	2016		
			Chaetura pelagica	VU	2018		
			Cryptoleucopteryx plumbea	VU	2016		✔
			Dacnis berlepschi	VU	2016		
			Geotrygon purpurata	EN	2016		✔
			Glaucidium nubicola	VU	2016		✔
			Grallaria gigantea	VU	2018		✔
			Lathrotriccus griseipectus	VU	2016		
			Micrastur plumbeus	VU	2016		
			Neomorphus radiolosus	EN	2016		✔
			Odontophorus melanonotus	VU	2016		✔
			Ognorhynchus icterotis	EN	2016		
			Pachyramphus spodiurus	VU	2019		
			Patagioenas subvinacea	VU	2016		✔
			Penelope ortoni	EN	2018		
			Spizaetus isidori	EN	2016		✔
		Mammals	*Anotomys leander*	EN	2017		
			Ateles fusciceps	EN	2020		
			Cebus aequatorialis	CR	2015		
			Heteromys teleus	VU	2016		
			Marmosa phaea	VU	2014		
			Mindomys hammondi	EN	2016		
			Mustela felipei	VU	2016		
		Plants	*Cedrela odorata*	VU	2017		
			Macleania coccoloboides	VU	2018		
			Macleania ericae	VU	2018		
		Reptiles	*Atractus occidentalis*	EN	2014		
			Atractus paucidens	VU	2014		
			Bothrops osbornei	VU	2016		
			Echinosaura keyi	VU	2016		

Country	KBA	Group	Species	IUCN Global Threat	Last IUCN assessment	Last IUCN record	GBIF records since 2010
			Enyalioides oshaughnessyi	VU	2015		✔
			Lepidoblepharis grandis	VU	2016		
Ecuador	Río Maquipucuna-Guayllabamba	Amphibians	*Atelopus coynei*	CR	2004		
			Centrolene ballux	EN	2016		
			Gastrotheca cornuta	EN	2008		
			Gastrotheca plumbea	VU	2004		
			Pristimantis apiculatus	EN	2016		
			Pristimantis calcarulatus	VU	2004		
			Pristimantis celator	VU	2016		
			Pristimantis crucifer	VU	2004		
			Pristimantis duellmani	VU	2004		
			Pristimantis eremitus	VU	2016		
			Pristimantis floridus	VU	2004		
			Pristimantis hectus	VU	2018		
			Pristimantis laticlavius	VU	2018		
			Pristimantis muricatus	VU	2004		
			Pristimantis pteridophilus	EN	2004		✔
			Pristimantis pyrrhomerus	EN	2004		
			Pristimantis quinquagesimus	VU	2016		
			Pristimantis surdus	EN	2004		
			Pristimantis vertebralis	VU	2004		
		Birds	*Aramides wolfi*	VU	2016		
			Attila torridus	VU	2016		
			Bangsia flavovirens	VU	2018		
			Chaetocercus bombus	VU	2016		
			Chaetura pelagica	VU	2018		
			Cryptoleucopteryx plumbea	VU	2016		
			Dacnis berlepschi	VU	2016		
			Eriocnemis nigrivestis	CR	2016		
			Geotrygon purpurata	EN	2016		
			Glaucidium nubicola	VU	2016		✔
			Grallaria alleni	VU	2018		✔
			Grallaria gigantea	VU	2018		✔
			Grallaria rufocinerea	VU	2016		
			Micrastur plumbeus	VU	2016		

Country	KBA	Group	Species	IUCN Global Threat	Last IUCN assessment	Last IUCN record	GBIF records since 2010
			Neomorphus radiolosus	EN	2016		
			Odontophorus melanonotus	VU	2016		✔
			Ognorhynchus icterotis	EN	2016		
			Patagioenas subvinacea	VU	2016		✔
			Penelope ortoni	EN	2018		
			Spizaetus isidori	EN	2016		✔
		Mammals	*Anotomys leander*	EN	2017		
			Caenolestes convelatus	VU	2016		
			Marmosa phaea	VU	2014		
			Mindomys hammondi	EN	2016		
			Mustela felipei	VU	2016		
			Neomicroxus latebricola	EN	2016		
			Tremarctos ornatus	VU	2016		✔
		Plants	*Cedrela odorata*	VU	2017		
			Macleania coccoloboides	VU	2018		
			Macleania ericae	VU	2018		
			Sphyrospermum sodiroi	VU	2018		
		Reptiles	*Atractus modestus*	VU	2014		
			Atractus occidentalis	EN	2014		
			Atractus paucidens	VU	2014		
			Bothrocophias campbelli	VU	2013		
			Bothrops osbornei	VU	2016		✔
			Dipsas elegans	VU	2014		✔
			Echinosaura brachycephala	EN	2014		✔
			Echinosaura keyi	VU	2016		
			Lepidoblepharis conolepis	EN	2016		
			Riama colomaromani	EN	2014		
			Riama oculata	EN	2014		
			Riama unicolor	VU	2018		
			Stenocercus varius	EN	2014		✔
Ecuador	Mashpi-Pachijal	Amphibians	*Atelopus coynei*	CR	2004		
			Centrolene ballux	EN	2016		
			Centrolene heloderma	VU	2016	1996	
			Centrolene lynchi	EN	2016		
			Centrolene scirtetes	EN	2018		
			Gastrotheca cornuta	EN	2008		
			Gastrotheca plumbea	VU	2004		
			Hyloscirtus criptico	EN	2016		
			Hyloxalus toachi	EN	2004		

Country	KBA	Group	Species	IUCN Global Threat	Last IUCN assessment	Last IUCN record	GBIF records since 2010
			Pristimantis apiculatus	EN	2016		
			Pristimantis calcarulatus	VU	2004		✔
			Pristimantis celator	VU	2016		
			Pristimantis crenunguis	EN	2004		✔
			Pristimantis crucifer	VU	2004		
			Pristimantis eremitus	VU	2016		✔
			Pristimantis floridus	VU	2004		
			Pristimantis hectus	VU	2018		✔
			Pristimantis laticlavius	VU	2018		
			Pristimantis muricatus	VU	2004		
			Pristimantis mutabilis	EN	2015		
			Pristimantis ornatissimus	VU	2004		✔
			Pristimantis pteridophilus	EN	2004		✔
			Pristimantis quinquagesimus	VU	2016		
			Pristimantis rosadoi	VU	2016		
			Pristimantis scolodiscus	VU	2016		✔
			Pristimantis vertebralis	VU	2004		
			Rhaebo caeruleostictus	EN	2004		
			Strabomantis helonotus	CR	2004		
		Birds	*Aramides wolfi*	VU	2016		
			Attila torridus	VU	2016		
			Bangsia flavovirens	VU	2018		✔
			Cephalopterus penduliger	VU	2016		✔
			Chaetocercus bombus	VU	2016		
			Chaetura pelagica	VU	2018		✔
			Cryptoleucopteryx plumbea	VU	2016		✔
			Dacnis berlepschi	VU	2016		✔
			Geotrygon purpurata	EN	2016		✔
			Glaucidium nubicola	VU	2016		✔
			Grallaria alleni	VU	2018		✔
			Grallaria gigantea	VU	2018		✔
			Grallaria rufocinerea	VU	2016		
			Lathrotriccus griseipectus	VU	2016		
			Micrastur plumbeus	VU	2016		✔

Country	KBA	Group	Species	IUCN Global Threat	Last IUCN assessment	Last IUCN record	GBIF records since 2010
			Neomorphus radiolosus	EN	2016		✔
			Odontophorus melanonotus	VU	2016		✔
			Ognorhynchus icterotis	EN	2016		
			Pachyramphus spodiurus	VU	2019		✔
			Patagioenas subvinacea	VU	2016		✔
			Penelope ortoni	EN	2018		✔
			Spizaetus isidori	EN	2016		✔
		Mammals	*Alouatta palliata*	VU	2015		
			Anotomys leander	EN	2017		
			Ateles fusciceps	EN	2020		
			Caenolestes convelatus	VU	2016		
			Cebus aequatorialis	CR	2015		
			Heteromys teleus	VU	2016		
			Marmosa phaea	VU	2014		
			Mindomys hammondi	EN	2016		
			Mustela felipei	VU	2016		
			Tremarctos ornatus	VU	2016		✔
		Plants	*Anthopterus ecuadorensis*	EN	2018		
			Anthopterus verticillatus	EN	2018		
			Cavendishia lebroniae	EN	2018		
			Cedrela odorata	VU	2017		
			Diogenesia amplectens	EN	2018		
			Macleania coccoloboides	VU	2018		
			Macleania ericae	VU	2018		
			Psammisia aurantiaca	EN	2018		
			Sphyrospermum sodiroi	VU	2018		
			Vaccinium distichum	EN	2018		
		Reptiles	*Atractus modestus*	VU	2014		
			Atractus occidentalis	EN	2014		
			Atractus paucidens	VU	2014		
			Bothrocophias campbelli	VU	2013		
			Bothrops osbornei	VU	2016		✔
			Dipsas elegans	VU	2014		✔
			Echinosaura brachycephala	EN	2014		
			Echinosaura keyi	VU	2016		
			Enyalioides oshaughnessyi	VU	2015		✔
			Lepidoblepharis conolepis	EN	2016		✔
			Lepidoblepharis grandis	VU	2016		

Country	KBA	Group	Species	IUCN Global Threat	Last IUCN assessment	Last IUCN record	GBIF records since 2010
			Riama oculata	EN	2014		
			Riama unicolor	VU	2018		
			Stenocercus varius	EN	2014		
Ecuador	Mindo and western foothills of Volcan Pichincha	Amphibians	*Atelopus coynei*	CR	2004		
			Atelopus ignescens	CR	2016	1988	
			Centrolene ballux	EN	2016		✔
			Centrolene heloderma	VU	2016	1996	
			Centrolene lynchi	EN	2016		
			Centrolene scirtetes	EN	2018		
			Ectopoglossus confusus	EN	2016		
			Gastrotheca cornuta	EN	2008		
			Gastrotheca plumbea	VU	2004		
			Hyloscirtus criptico	EN	2016		
			Nymphargus balionota	VU	2004		
			Pristimantis apiculatus	EN	2016		
			Pristimantis calcarulatus	VU	2004		✔
			Pristimantis celator	VU	2016		
			Pristimantis crenunguis	EN	2004		
			Pristimantis crucifer	VU	2004		✔
			Pristimantis dissimulatus	EN	2004		
			Pristimantis duellmani	VU	2004		
			Pristimantis eremitus	VU	2016		✔
			Pristimantis eugeniae	EN	2004		✔
			Pristimantis floridus	VU	2004		
			Pristimantis hamiotae	CR	2004		
			Pristimantis hectus	VU	2018		
			Pristimantis laticlavius	VU	2018		
			Pristimantis muricatus	VU	2004		✔
			Pristimantis mutabilis	EN	2015		
			Pristimantis nyctophylax	VU	2004		✔
			Pristimantis ornatissimus	VU	2004		
			Pristimantis pteridophilus	EN	2004		
			Pristimantis pyrrhomerus	EN	2004		
			Pristimantis quinquagesimus	VU	2016		✔

Country	KBA	Group	Species	IUCN Global Threat	Last IUCN assessment	Last IUCN record	GBIF records since 2010
			Pristimantis sobetes	EN	2004		✔
			Pristimantis surdus	EN	2004		
			Pristimantis vertebralis	VU	2004		
			Rhaebo caeruleostictus	EN	2004		
			Strabomantis helonotus	CR	2004		
		Birds	*Agriornis albicauda*	VU	2016		
			Attila torridus	VU	2016		
			Bangsia flavovirens	VU	2018		✔
			Chaetocercus bombus	VU	2016		✔
			Chaetura pelagica	VU	2018		
			Cryptoleucopteryx plumbea	VU	2016		✔
			Dacnis berlepschi	VU	2016		
			Eriocnemis nigrivestis	CR	2016		✔
			Geotrygon purpurata	EN	2016		✔
			Glaucidium nubicola	VU	2016		✔
			Grallaria alleni	VU	2018		✔
			Grallaria gigantea	VU	2018		✔
			Grallaria rufocinerea	VU	2016		
			Lathrotriccus griseipectus	VU	2016		✔
			Micrastur plumbeus	VU	2016		✔
			Neomorphus radiolosus	EN	2016		✔
			Odontophorus melanonotus	VU	2016		✔
			Ognorhynchus icterotis	EN	2016		
			Patagioenas subvinacea	VU	2016		✔
			Penelope ortoni	EN	2018		✔
			Spizaetus isidori	EN	2016		✔
		Mammals	*Anotomys leander*	EN	2017		
			Caenolestes convelatus	VU	2016		
			Heteromys teleus	VU	2016		
			Marmosa phaea	VU	2014		
			Mindomys hammondi	EN	2016		
			Mustela felipei	VU	2016		
			Neomicroxus latebricola	EN	2016		
			Thomasomys ucucha	VU	2016		
			Tremarctos ornatus	VU	2016		✔
		Plants	*Anthopterus ecuadorensis*	EN	2018		
			Anthopterus verticillatus	EN	2018		

Country	KBA	Group	Species	IUCN Global Threat	Last IUCN assessment	Last IUCN record	GBIF records since 2010
			Cedrela odorata	VU	2017		
			Diogenesia amplectens	EN	2018		
			Macleania alata	EN	2018		
			Macleania coccoloboides	VU	2018		✔
			Macleania ericae	VU	2018		
			Psammisia aurantiaca	EN	2018		
			Psammisia flaviflora	EN	2018		
			Puya sodiroana	EN	2018		
			Sphyrospermum sodiroi	VU	2018		✔
			Thibaudia gunnarii	VU	2018		
			Thibaudia inflata	VU	2018		
			Vaccinium distichum	EN	2018		
		Reptiles	*Anolis otongae*	VU	2014		
			Anolis proboscis	EN	2014		✔
			Atractus modestus	VU	2014		
			Atractus occidentalis	EN	2014		✔
			Atractus paucidens	VU	2014		
			Bothrocophias campbelli	VU	2013		✔
			Bothrops osbornei	VU	2016		✔
			Dipsas elegans	VU	2014		✔
			Echinosaura brachycephala	EN	2014		
			Echinosaura keyi	VU	2016		
			Enyalioides oshaughnessyi	VU	2015		
			Lepidoblepharis conolepis	EN	2016		
			Lepidoblepharis grandis	VU	2016		
			Riama colomaromani	EN	2014		
			Riama oculata	EN	2014		
			Riama unicolor	VU	2018		✔
			Stenocercus varius	EN	2014		✔
Ecuador	Montañas de Zapote-Najda	Amphibians	*Atelopus nepiozomus*	EN	2016		
			Hyloxalus vertebralis	CR	2004		
			Pristimantis baryecuus	EN	2004		
			Pristimantis cryophilius	EN	2004		
			Pristimantis proserpens	VU	2017		
			Pristimantis pycnodermis	EN	2004		
			Telmatobius niger	CR	2008	1994	
		Birds	*Agriornis albicauda*	VU	2016		
			Chaetocercus bombus	VU	2016		

Country	KBA	Group	Species	IUCN Global Threat	Last IUCN assessment	Last IUCN record	GBIF records since 2010
			Chaetura pelagica	VU	2018		
			Doliornis remseni	VU	2016		
			Hapalopsittaca pyrrhops	VU	2016		
			Spizaetus isidori	EN	2016		
			Tephrophilus wetmorei	VU	2018		
		Mammals	*Aotus lemurinus*	VU	2008		
			Mazama rufina	VU	2015		
			Tremarctos ornatus	VU	2016		
		Plants	*Baccharis hieronymi*	VU	2014		
			Cavendishia orthosepala	EN	2018		
			Cedrela odorata	VU	2017		
			Ceratostema nubigena	EN	2018		
			Orthaea oriens	VU	2018		
			Plutarchia ecuadorensis	EN	2018		
			Puya brackeana	CR	2018		
			Puya maculata	VU	2018		
			Puya navarroana	EN	2018		
			Themistoclesia campii	CR	2018		
		Reptiles	*Riama stigmatoral*	VU	2014		
			Stenocercus festae	VU	2014		
Ecuador	Parque Nacional Podocarpus	Amphibians	*Atelopus nepiozomus*	EN	2016		
			Atelopus podocarpus	CR	2018	1994	
			Centrolene buckleyi	VU	2008		
			Gastrotheca lojana	VU	2016		
			Gastrotheca psychrophila	EN	2016		
			Hyloxalus anthracinus	CR	2004		
			Nymphargus cochranae	VU	2008		
			Pristimantis balionotus	EN	2004		
			Pristimantis percultus	EN	2004		
			Pristimantis proserpens	VU	2017		
			Strabomantis cornutus	VU	2004		
			Telmatobius cirrhacelis	CR	2008	1981	
		Arthropods	*Parides phalaecus*	VU	2019		
		Birds	*Agriornis albicauda*	VU	2016		
			Chaetocercus bombus	VU	2016		
			Chaetura pelagica	VU	2018		
			Conopias cinchoneti	VU	2016		✔
			Cranioleuca curtata	VU	2016		✔

Country	KBA	Group	Species	IUCN Global Threat	Last IUCN assessment	Last IUCN record	GBIF records since 2010
			Doliornis remseni	VU	2016		
			Dysithamnus leucostictus	VU	2016		
			Galbula pastazae	VU	2016		✔
			Grallaria ridgelyi	EN	2016		✔
			Hapalopsittaca pyrrhops	VU	2016		✔
			Herpsilochmus axillaris	VU	2016		✔
			Patagioenas subvinacea	VU	2016		
			Phlogophilus hemileucurus	VU	2016		✔
			Pyrrhura albipectus	VU	2016		✔
			Sericossypha albocristata	VU	2018		✔
			Spizaetus isidori	EN	2016		✔
			Tephrophilus wetmorei	VU	2018		✔
			Thamnophilus tenuepunctatus	VU	2016		
			Tinamus tao	VU	2018		
			Touit stictopterus	VU	2016		
			Zimmerius cinereicapilla	VU	2016		
		Mammals	*Aotus lemurinus*	VU	2008		
			Caenolestes sangay	VU	2016		
			Mazama rufina	VU	2015		✔
			Sturnira nana	EN	2015		
			Tapirus pinchaque	EN	2014		
			Tapirus terrestris	VU	2018		
			Tayassu pecari	VU	2012		
			Thomasomys pyrrhonotus	VU	2008		
			Tremarctos ornatus	VU	2016		✔
		Fish	*Astroblepus supramollis*	VU	2014		
		Plants	*Cedrela odorata*	VU	2017		
			Ceratostema lanceolatum	EN	2018		
			Ceratostema nubigena	EN	2018		
			Costus zamoranus	EN	2015		
			Isoetes ecuadoriensis	VU	2014		
			Macleania mollis	VU	2018		
			Oreanthes ecuadorensis	EN	2018		
			Oreanthes fragilis	VU	2018		
			Oreanthes glanduliferus	EN	2018		
			Oreanthes hypogaeus	EN	2018		
			Orthaea oriens	VU	2018		
			Puya aequatorialis	VU	2018		
			Puya exigua	EN	2018		
			Puya maculata	VU	2018		

Country	KBA	Group	Species	IUCN Global Threat	Last IUCN assessment	Last IUCN record	GBIF records since 2010
			Puya obconica	EN	2018		
			Puya parviflora	EN	2018		
			Thibaudia joergensenii	EN	2018		
			Thibaudia steyermarkii	VU	2018		
		Reptiles	*Anolis podocarpus*	VU	2014		
			Atractus carrioni	EN	2014		
			Bothrops lojanus	VU	2019		
			Enyalioides rubrigularis	VU	2014		
			Riama anatoloros	VU	2014		
			Stenocercus festae	VU	2014		
			Stenocercus ornatus	VU	2014		
Ecuador	Parque Nacional Sumaco-Napo Galeras	Amphibians	*Allobates kingsburyi*	EN	2004		
			Atelopus spumarius	VU	2008		
			Centrolene buckleyi	VU	2008		
			Hyloscirtus staufferorum	EN	2016		
			Hyloscirtus torrenticola	VU	2016		
			Nymphargus cochranae	VU	2008		
			Nymphargus siren	VU	2008		
			Osornophryne guacamayo	EN	2008		✔
			Osornophryne sumacoensis	VU	2004		
			Pristimantis colonensis	VU	2016		
			Pristimantis devillei	EN	2004		
			Pristimantis eriphus	VU	2016		✔
			Pristimantis ernesti	VU	2004		
			Pristimantis festae	EN	2004		
			Pristimantis gladiator	VU	2017		
			Pristimantis incanus	EN	2004		
			Pristimantis inusitatus	VU	2004		
			Pristimantis nigrogriseus	VU	2004		
			Pristimantis prolatus	EN	2004		✔
			Pristimantis pugnax	CR	2016		
			Pristimantis rubicundus	EN	2004		
			Strabomantis cornutus	VU	2004		
		Birds	*Agamia agami*	VU	2016		
			Ara militaris	VU	2016		✔
			Chaetocercus bombus	VU	2016		

Country	KBA	Group	Species	IUCN Global Threat	Last IUCN assessment	Last IUCN record	GBIF records since 2010
			Chaetura pelagica	VU	2018		
			Chloropipo flavicapilla	VU	2016		
			Conopias cinchoneti	VU	2016		✔
			Cranioleuca curtata	VU	2016		
			Dysithamnus leucostictus	VU	2016		✔
			Dysithamnus occidentalis	VU	2016		
			Galbula pastazae	VU	2016		✔
			Grallaria alleni	VU	2018		✔
			Grallaria gigantea	VU	2018		
			Heliodoxa gularis	VU	2016		✔
			Herpsilochmus axillaris	VU	2016		✔
			Neomorphus geoffroyi	VU	2016		
			Patagioenas subvinacea	VU	2016		✔
			Phlogophilus hemileucurus	VU	2016		
			Ramphastos culminatus	VU	2016		
			Sericossypha albocristata	VU	2018		✔
			Spizaetus isidori	EN	2016		
			Thamnophilus tenuepunctatus	VU	2016		✔
			Tinamus osgoodi	VU	2018		
			Tinamus tao	VU	2018		
			Touit huetii	VU	2016		
			Touit stictopterus	VU	2016		
			Zimmerius cinereicapilla	VU	2016		
		Mammals	*Aotus lemurinus*	VU	2008		
			Leopardus tigrinus	VU	2016		
			Mazama rufina	VU	2015		
			Mustela felipei	VU	2016		
			Myrmecophaga tridactyla	VU	2013		
			Neomicroxus latebricola	EN	2016		
			Priodontes maximus	VU	2013		
			Pteronura brasiliensis	EN	2014		
			Tapirus pinchaque	EN	2014		
			Tapirus terrestris	VU	2018		
			Tayassu pecari	VU	2012		
			Tremarctos ornatus	VU	2016		
			Vampyressa melissa	VU	2015		
		Plants	*Cedrela odorata*	VU	2017		
			Ceratostema nodosum	VU	2018		
			Orthaea oriens	VU	2018		
			Psammisia incana	EN	2018		

Country	KBA	Group	Species	IUCN Global Threat	Last IUCN assessment	Last IUCN record	GBIF records since 2010
		Reptiles	*Atractus duboisi*	EN	2014		
			Morunasaurus annularis	VU	2014		
			Riama anatoloros	VU	2014		
			Riama orcesi	VU	2014		
			Riama raneyi	VU	2014		
Ecuador	Reserva Ecológica Cotacachi -Cayapas	Amphibians	*Agalychnis litodryas*	VU	2004		
			Atelopus coynei	CR	2004		
			Atelopus elegans	EN	2019		
			Bolitoglossa chica	VU	2004		
			Centrolene buckleyi	VU	2008		
			Cochranella litoralis	VU	2018		
			Gastrotheca cornuta	EN	2008		
			Gastrotheca plumbea	VU	2004		✔
			Gastrotheca riobambae	EN	2004		✔
			Hyloscirtus criptico	EN	2016		
			Hyloxalus toachi	EN	2004		
			Pristimantis apiculatus	EN	2016		
			Pristimantis calcarulatus	VU	2004		
			Pristimantis celator	VU	2016		
			Pristimantis crucifer	VU	2004		✔
			Pristimantis degener	EN	2016		
			Pristimantis duellmani	VU	2004		
			Pristimantis eremitus	VU	2016		
			Pristimantis floridus	VU	2004		
			Pristimantis hectus	VU	2018		
			Pristimantis laticlavius	VU	2018		
			Pristimantis muricatus	VU	2004		✔
			Pristimantis mutabilis	EN	2015		
			Pristimantis ornatissimus	VU	2004		
			Pristimantis pyrrhomerus	EN	2004		
			Pristimantis quinquagesimus	VU	2016		
			Pristimantis rosadoi	VU	2016		
			Pristimantis scolodiscus	VU	2016		✔
			Pristimantis tenebrionis	EN	2004		
			Pristimantis vertebralis	VU	2004		✔

Country	KBA	Group	Species	IUCN Global Threat	Last IUCN assessment	Last IUCN record	GBIF records since 2010
			Rhaebo caeruleostictus	EN	2004		
		Birds	*Ara ambiguus*	EN	2016		
			Aramides wolfi	VU	2016		
			Attila torridus	VU	2016		
			Bangsia flavovirens	VU	2018		
			Cephalopterus penduliger	VU	2016		✔
			Chaetocercus bombus	VU	2016		
			Chaetura pelagica	VU	2018		
			Conopias cinchoneti	VU	2016		
			Crax rubra	VU	2016		
			Cryptoleucopteryx plumbea	VU	2016		
			Dacnis berlepschi	VU	2016		
			Eriocnemis nigrivestis	CR	2016		
			Geotrygon purpurata	EN	2016		
			Glaucidium nubicola	VU	2016		
			Grallaria alleni	VU	2018		
			Grallaria gigantea	VU	2018		
			Grallaria rufocinerea	VU	2016		
			Micrastur plumbeus	VU	2016		
			Neomorphus radiolosus	EN	2016		✔
			Odontophorus melanonotus	VU	2016		
			Ognorhynchus icterotis	EN	2016		
			Ortalis erythroptera	VU	2018		
			Pachyramphus spodiurus	VU	2019		
			Patagioenas subvinacea	VU	2016		✔
			Penelope ortoni	EN	2018		✔
			Spizaetus isidori	EN	2016		
		Mammals	*Alouatta palliata*	VU	2015		
			Ateles fusciceps	EN	2020		✔
			Balantiopteryx infusca	VU	2014		
			Caenolestes convelatus	VU	2016		
			Cebus aequatorialis	CR	2015		
			Choeroniscus periosus	VU	2014		
			Marmosa phaea	VU	2014		
			Mindomys hammondi	EN	2016		
			Mustela felipei	VU	2016		
			Neomicroxus latebricola	EN	2016		
			Tayassu pecari	VU	2012		✔

Country	KBA	Group	Species	IUCN Global Threat	Last IUCN assessment	Last IUCN record	GBIF records since 2010
			Thomasomys ucucha	VU	2016		
		Fish	*Astroblepus ubidiai*	CR	2014		
			Hypostomus annectens	VU	2014		
			Pseudochalceus longianalis	VU	2014		
		Plants	*Cavendishia parviflora*	EN	2018		
			Cedrela odorata	VU	2017		
			Macleania ericae	VU	2018		
			Macleania subsessilis	VU	2018		
			Puya hirtzii	CR	2018		
			Thibaudia litensis	VU	2018		
		Reptiles	*Anolis parilis*	VU	2014		
			Atractus occidentalis	EN	2014		
			Atractus paucidens	VU	2014		
			Bothrocophias campbelli	VU	2013		✔
			Corallus blombergi	EN	2013		
			Dipsas ellipsifera	EN	2014		
			Echinosaura keyi	VU	2016		
			Emmochliophis miops	CR	2014		
			Enyalioides oshaughnessyi	VU	2015		
			Lepidoblepharis conolepis	EN	2016		✔
			Lepidoblepharis grandis	VU	2016		
			Riama colomaromani	EN	2014		
			Riama simotera	EN	2013		
			Riama unicolor	VU	2018		
			Stenocercus varius	EN	2014		
			Synophis bicolor	EN	2013		
Ecuador	Reserva Ecológica Los Illinizas y alrededores	Amphibians	*Atelopus ignescens*	CR	2016	1988	
			Centrolene gemmatum	CR	2004		
			Centrolene lynchi	EN	2016		
			Colostethus jacobuspetersi	CR	2004	1960s	
			Ectopoglossus confusus	EN	2016		
			Epipedobates tricolor	VU	2016		
			Gastrotheca cornuta	EN	2008		
			Gastrotheca plumbea	VU	2004		
			Hyloscirtus ptychodactylus	EN	2016		
			Pristimantis actites	VU	2004		
			Pristimantis apiculatus	EN	2016		
			Pristimantis calcarulatus	VU	2004		

Country	KBA	Group	Species	IUCN Global Threat	Last IUCN assessment	Last IUCN record	GBIF records since 2010
			Pristimantis celator	VU	2016		
			Pristimantis crenunguis	EN	2004		
			Pristimantis crucifer	VU	2004		
			Pristimantis eremitus	VU	2016		
			Pristimantis eugeniae	EN	2004		
			Pristimantis floridus	VU	2004		
			Pristimantis muricatus	VU	2004		✔
			Pristimantis nyctophylax	VU	2004		✔
			Pristimantis ornatissimus	VU	2004		
			Pristimantis pyrrhomerus	EN	2004		
			Pristimantis quinquagesimus	VU	2016		
			Pristimantis truebae	EN	2004		
			Pristimantis vertebralis	VU	2004		
			Rhaebo caeruleostictus	EN	2004		
		Arthropods	*Perissolestes remus*	CR	2014	1941	
			Philogenia monotis	EN	2014		
		Birds	*Agriornis albicauda*	VU	2016		
			Aramides wolfi	VU	2016		
			Attila torridus	VU	2016		
			Bangsia flavovirens	VU	2018		
			Cephalopterus penduliger	VU	2016		
			Chaetocercus bombus	VU	2016		
			Chaetura pelagica	VU	2018		
			Cryptoleucopteryx plumbea	VU	2016		
			Grallaria alleni	VU	2018		✔
			Grallaria gigantea	VU	2018		
			Neomorphus radiolosus	EN	2016		
			Odontophorus melanonotus	VU	2016		✔
			Ognorhynchus icterotis	EN	2016		
			Patagioenas subvinacea	VU	2016		
			Spizaetus isidori	EN	2016		
		Mammals	*Alouatta palliata*	VU	2015		
			Anotomys leander	EN	2017		
			Ateles fusciceps	EN	2020		
			Caenolestes convelatus	VU	2016		
			Heteromys teleus	VU	2016		
			Marmosa phaea	VU	2014		

Country	KBA	Group	Species	IUCN Global Threat	Last IUCN assessment	Last IUCN record	GBIF records since 2010
			Mindomys hammondi	EN	2016		
			Neomicroxus latebricola	EN	2016		
			Tremarctos ornatus	VU	2016		
		Plants	*Cedrela odorata*	VU	2017		
			Diogenesia amplectens	EN	2018		
			Macleania coccoloboides	VU	2018		
			Macleania ericae	VU	2018		
			Oreanthes ecuadorensis	EN	2018		
			Psammisia flaviflora	EN	2018		
			Puya vestita	VU	2018		
			Sphyrospermum sodiroi	VU	2018		
			Thibaudia inflata	VU	2018		
		Reptiles	*Anolis otongae*	VU	2014		
			Atractus modestus	VU	2014		
			Bothrocophias campbelli	VU	2013		
			Bothrops osbornei	VU	2016		
			Dipsas elegans	VU	2014		
			Echinosaura brachycephala	EN	2014		
			Enyalioides oshaughnessyi	VU	2015		
			Lepidoblepharis conolepis	EN	2016		
			Lepidoblepharis grandis	VU	2016		
			Riama colomaromani	EN	2014		
			Riama crypta	EN	2014		
			Riama labionis	EN	2014		
			Riama oculata	EN	2014		
			Riama unicolor	VU	2018		
			Stenocercus varius	EN	2014		
Ecuador	Reserva Tapichalaca	Amphibians	*Atelopus nepiozomus*	EN	2016		
			Centrolene buckleyi	VU	2008		
			Pristimantis proserpens	VU	2017		
		Arthropods	*Parides phalaecus*	VU	2019		
		Birds	*Agriornis albicauda*	VU	2016		
			Chaetocercus bombus	VU	2016		
			Chaetura pelagica	VU	2018		
			Cranioleuca curtata	VU	2016		✔
			Doliornis remseni	VU	2016		
			Grallaria ridgelyi	EN	2016		✔
			Hapalopsittaca pyrrhops	VU	2016		
			Patagioenas subvinacea	VU	2016		✔

Country	KBA	Group	Species	IUCN Global Threat	Last IUCN assessment	Last IUCN record	GBIF records since 2010
			Pyrrhura albipectus	VU	2016		✔
			Sericossypha albocristata	VU	2018		✔
			Spizaetus isidori	EN	2016		✔
			Thamnophilus tenuepunctatus	VU	2016		
			Touit stictopterus	VU	2016		
			Zimmerius cinereicapilla	VU	2016		
		Mammals	*Aotus lemurinus*	VU	2008		
			Caenolestes sangay	VU	2016		
			Mazama rufina	VU	2015		
			Tapirus pinchaque	EN	2014		
			Tapirus terrestris	VU	2018		
			Thomasomys pyrrhonotus	VU	2008		
		Plants	*Cedrela odorata*	VU	2017		
			Costus zamoranus	EN	2015		
			Isoetes ecuadoriensis	VU	2014		
			Macleania mollis	VU	2018		
			Oreanthes hypogaeus	EN	2018		
			Puya maculata	VU	2018		
			Puya obconica	EN	2018		
			Thibaudia joergensenii	EN	2018		
			Thibaudia steyermarkii	VU	2018		
Ecuador	Río Caoní	Amphibians	*Agalychnis litodryas*	VU	2004		
			Bolitoglossa chica	VU	2004		
			Hyloxalus toachi	EN	2004		
			Pristimantis crenunguis	EN	2004		
			Pristimantis floridus	VU	2004		
			Pristimantis muricatus	VU	2004		
			Pristimantis ornatissimus	VU	2004		
			Pristimantis rosadoi	VU	2016		
			Pristimantis tenebrionis	EN	2004		
			Rhaebo caeruleostictus	EN	2004		
		Birds	*Aramides wolfi*	VU	2016		
			Attila torridus	VU	2016		
			Bangsia flavovirens	VU	2018		
			Cephalopterus penduliger	VU	2016		✔
			Chaetocercus bombus	VU	2016		
			Chaetura pelagica	VU	2018		
			Cryptoleucopteryx plumbea	VU	2016		

Country	KBA	Group	Species	IUCN Global Threat	Last IUCN assessment	Last IUCN record	GBIF records since 2010
			Dacnis berlepschi	VU	2016		✔
			Geotrygon purpurata	EN	2016		
			Micrastur plumbeus	VU	2016		
			Neomorphus radiolosus	EN	2016		
			Ortalis erythroptera	VU	2018		
			Pachyramphus spodiurus	VU	2019		
			Patagioenas subvinacea	VU	2016		✔
		Mammals	*Alouatta palliata*	VU	2015		
			Anotomys leander	EN	2017		
			Ateles fusciceps	EN	2020		
			Cebus aequatorialis	CR	2015		
			Heteromys teleus	VU	2016		
			Marmosa phaea	VU	2014		
			Mindomys hammondi	EN	2016		
			Tayassu pecari	VU	2012		
		Plants	*Cedrela odorata*	VU	2017		
			Macleania ericae	VU	2018		
		Reptiles	*Atractus occidentalis*	EN	2014		
			Atractus paucidens	VU	2014		
			Echinosaura keyi	VU	2016		
			Enyalioides oshaughnessyi	VU	2015		
Ecuador	Río Toachi-Chiriboga	Amphibians	*Atelopus coynei*	CR	2004		
			Atelopus ignescens	CR	2016	1988	
			Centrolene ballux	EN	2016		
			Centrolene heloderma	VU	2016	1996	
			Centrolene lynchi	EN	2016		✔
			Colostethus jacobuspetersi	CR	2004	1960s	
			Ectopoglossus confusus	EN	2016		
			Gastrotheca cornuta	EN	2008		
			Gastrotheca dendronastes	EN	2016		
			Gastrotheca plumbea	VU	2004		
			Pristimantis apiculatus	EN	2016		
			Pristimantis calcarulatus	VU	2004		
			Pristimantis celator	VU	2016		
			Pristimantis crenunguis	EN	2004		✔
			Pristimantis crucifer	VU	2004		
			Pristimantis dissimulatus	EN	2004		
			Pristimantis duellmani	VU	2004		

Country	KBA	Group	Species	IUCN Global Threat	Last IUCN assessment	Last IUCN record	GBIF records since 2010
			Pristimantis eremitus	VU	2016		
			Pristimantis eugeniae	EN	2004		✔
			Pristimantis floridus	VU	2004		
			Pristimantis laticlavius	VU	2018		
			Pristimantis muricatus	VU	2004		✔
			Pristimantis nyctophylax	VU	2004		
			Pristimantis ornatissimus	VU	2004		
			Pristimantis pteridophilus	EN	2004		
			Pristimantis pyrrhomerus	EN	2004		
			Pristimantis quinquagesimus	VU	2016		
			Pristimantis sobetes	EN	2004		
			Pristimantis surdus	EN	2004		
			Pristimantis vertebralis	VU	2004		
			Rhaebo caeruleostictus	EN	2004		
		Birds	*Agriornis albicauda*	VU	2016		
			Aramides wolfi	VU	2016		
			Attila torridus	VU	2016		
			Bangsia flavovirens	VU	2018		
			Chaetocercus bombus	VU	2016		
			Chaetura pelagica	VU	2018		
			Cryptoleucopteryx plumbea	VU	2016		
			Eriocnemis nigrivestis	CR	2016		
			Grallaria alleni	VU	2018		
			Grallaria gigantea	VU	2018		✔
			Grallaria rufocinerea	VU	2016		
			Neomorphus radiolosus	EN	2016		
			Odontophorus melanonotus	VU	2016		✔
			Ognorhynchus icterotis	EN	2016		
			Patagioenas subvinacea	VU	2016		✔
			Spizaetus isidori	EN	2016		
		Mammals	*Anotomys leander*	EN	2017		
			Caenolestes convelatus	VU	2016		
			Heteromys teleus	VU	2016		
			Marmosa phaea	VU	2014		
			Mindomys hammondi	EN	2016		
			Mustela felipei	VU	2016		

Country	KBA	Group	Species	IUCN Global Threat	Last IUCN assessment	Last IUCN record	GBIF records since 2010
			Neomicroxus latebricola	EN	2016		
			Thomasomys ucucha	VU	2016		
			Tremarctos ornatus	VU	2016		
		Plants	*Anthopterus ecuadorensis*	EN	2018		
			Anthopterus verticillatus	EN	2018		
			Cedrela odorata	VU	2017		
			Diogenesia amplectens	EN	2018		
			Disterigma micranthum	CR	2018		
			Macleania alata	EN	2018		
			Macleania coccoloboides	VU	2018		
			Macleania ericae	VU	2018		
			Psammisia aurantiaca	EN	2018		
			Psammisia flaviflora	EN	2018		
			Puya sodiroana	EN	2018		
			Puya tillii	EN	2018		
			Puya vestita	VU	2018		
			Sphyrospermum sodiroi	VU	2018		
			Thibaudia gunnarii	VU	2018		
			Thibaudia inflata	VU	2018		
			Vaccinium distichum	EN	2018		
		Reptiles	*Anolis otongae*	VU	2014		
			Atractus modestus	VU	2014		
			Bothrocophias campbelli	VU	2013		
			Bothrops osbornei	VU	2016		
			Dipsas elegans	VU	2014		
			Echinosaura brachycephala	EN	2014		
			Enyalioides oshaughnessyi	VU	2015		✔
			Lepidoblepharis conolepis	EN	2016		
			Lepidoblepharis grandis	VU	2016		
			Riama colomaromani	EN	2014		
			Riama crypta	EN	2014		
			Riama labionis	EN	2014		
			Riama oculata	EN	2014		
			Riama unicolor	VU	2018		
			Stenocercus varius	EN	2014		
Ecuador	Saraguro Las Antenas	Amphibians	*Centrolene buckleyi*	VU	2008		
			Gastrotheca lojana	VU	2016		
			Hyloxalus vertebralis	CR	2004		

Country	KBA	Group	Species	IUCN Global Threat	Last IUCN assessment	Last IUCN record	GBIF records since 2010
			Pristimantis orestes	EN	2004		
			Pristimantis vidua	EN	2004		
			Telmatobius vellardi	CR	2008	1987	
		Birds	*Agriornis albicauda*	VU	2016		✔
			Chaetocercus bombus	VU	2016		
			Chaetura pelagica	VU	2018		
			Doliornis remseni	VU	2016		✔
			Hapalopsittaca pyrrhops	VU	2016		✔
			Spizaetus isidori	EN	2016		✔
			Tephrophilus wetmorei	VU	2018		✔
		Mammals	*Mazama rufina*	VU	2015		
			Thomasomys hudsoni	VU	2016		
			Thomasomys pyrrhonotus	VU	2008		
		Plants	*Cedrela odorata*	VU	2017		
			Isoetes ecuadoriensis	VU	2014		
			Oreanthes fragilis	VU	2018		
			Puya aequatorialis	VU	2018		
			Puya compacta	EN	2018		
			Puya joergensenii	EN	2018		
			Puya roseana	CR	2018		
		Reptiles	*Bothrops lojanus*	VU	2019		
			Riama vespertina	VU	2018		
			Stenocercus festae	VU	2014		
Ecuador	Awá Ethnic Territory and surroundings	Amphibians	*Atelopus coynei*	CR	2004		✔
			Atelopus elegans	EN	2019		✔
			Cochranella litoralis	VU	2018		
			Gastrotheca cornuta	EN	2008		
			Hyloxalus toachi	EN	2004		
			Nymphargus balionota	VU	2004		
			Pristimantis apiculatus	EN	2016		
			Pristimantis calcarulatus	VU	2004		
			Pristimantis degener	EN	2016		
			Pristimantis duellmani	VU	2004		
			Pristimantis eremitus	VU	2016		
			Pristimantis hectus	VU	2018		
			Pristimantis laticlavius	VU	2018		
			Pristimantis quinquagesimus	VU	2016		
			Pristimantis rosadoi	VU	2016		

Country	KBA	Group	Species	IUCN Global Threat	Last IUCN assessment	Last IUCN record	GBIF records since 2010
			Pristimantis scolodiscus	VU	2016		
			Pristimantis tenebrionis	EN	2004		
			Rhaebo andinophrynoides	VU	2016		
			Rhaebo caeruleostictus	EN	2004		
			Strabomantis anatipes	VU	2016		
		Birds	*Ara ambiguus*	EN	2016		
			Aramides wolfi	VU	2016		✔
			Attila torridus	VU	2016		✔
			Bangsia flavovirens	VU	2018		✔
			Cephalopterus penduliger	VU	2016		
			Chaetocercus bombus	VU	2016		
			Chaetura pelagica	VU	2018		✔
			Conopias cinchoneti	VU	2016		
			Crax rubra	VU	2016		
			Cryptoleucopteryx plumbea	VU	2016		✔
			Dacnis berlepschi	VU	2016		✔
			Geotrygon purpurata	EN	2016		✔
			Glaucidium nubicola	VU	2016		
			Grallaria alleni	VU	2018		
			Grallaria gigantea	VU	2018		
			Micrastur plumbeus	VU	2016		✔
			Neomorphus radiolosus	EN	2016		
			Odontophorus melanonotus	VU	2016		✔
			Ognorhynchus icterotis	EN	2016		
			Ortalis erythroptera	VU	2018		✔
			Pachyramphus spodiurus	VU	2019		
			Patagioenas subvinacea	VU	2016		✔
			Penelope ortoni	EN	2018		✔
			Spizaetus isidori	EN	2016		✔
		Mammals	*Alouatta palliata*	VU	2015		
			Ateles fusciceps	EN	2020		
			Caenolestes convelatus	VU	2016		✔
			Cebus aequatorialis	CR	2015		
			Choeroniscus periosus	VU	2014		
			Marmosa phaea	VU	2014		
			Mustela felipei	VU	2016		
			Neomicroxus latebricola	EN	2016		
			Tayassu pecari	VU	2012		

Country	KBA	Group	Species	IUCN Global Threat	Last IUCN assessment	Last IUCN record	GBIF records since 2010
			Tremarctos ornatus	VU	2016		
		Fish	*Hypostomus annectens*	VU	2014		
			Pseudochalceus longianalis	VU	2014		
			Sturisomatichthys frenatus	CR	2014		
		Plants	*Cedrela odorata*	VU	2017		
			Macleania maldonadensis	EN	2018		
			Puya hirtzii	CR	2018		
		Reptiles	*Anolis parilis*	VU	2014		
			Atractus occidentalis	EN	2014		
			Atractus paucidens	VU	2014		
			Bothrocophias campbelli	VU	2013		
			Corallus blombergi	EN	2013		
			Dipsas ellipsifera	EN	2014		
			Echinosaura keyi	VU	2016		
			Enyalioides oshaughnessyi	VU	2015		
			Lepidoblepharis conolepis	EN	2016		
			Synophis bicolor	EN	2013		
Perú	6 km south of Ocobamb a	Amphibians	*Gastrotheca excubitor*	VU	2017		
		Birds	*Agamia agami*	VU	2016		
			Agriornis albicauda	VU	2016		
			Anairetes alpinus	EN	2016		✔
			Asthenes helleri	VU	2016		
			Chaetura pelagica	VU	2018		
			Cinclodes aricomae	CR	2016		✔
			Conopias cinchoneti	VU	2016		✔
			Cranioleuca curtata	VU	2016		
			Cranioleuca marcapatae	VU	2016		✔
			Leptasthenura xenothorax	EN	2016		✔
			Leptosittaca branickii	VU	2016		
			Nothocercus nigrocapillus	VU	2016		
			Nothoprocta taczanowskii	VU	2018		
			Patagioenas subvinacea	VU	2016		
			Primolius couloni	VU	2018		
			Spizaetus isidori	EN	2016		
			Tinamus tao	VU	2018		
			Zimmerius cinereicapilla	VU	2016		
		Mammals	*Akodon surdus*	VU	2017		
			Hippocamelus antisensis	VU	2016		
			Lagothrix lagothricha	VU	2020		

Country	KBA	Group	Species	IUCN Global Threat	Last IUCN assessment	Last IUCN record	GBIF records since 2010
			Leopardus jacobita	EN	2014		
			Mazama chunyi	VU	2016		
			Mormopterus phrudus	VU	2015		
			Tapirus terrestris	VU	2018		
			Tayassu pecari	VU	2012		
		Plants	*Cedrela odorata*	VU	2017		
			Gentianella vargasii	VU	2018		
Peru	Abra Málaga-Vilcanota	Amphibians	*Gastrotheca excubitor*	VU	2017		
			Gastrotheca ochoai	EN	2017		
			Nannophryne corynetes	EN	2017		
		Birds	*Agriornis albicauda*	VU	2016		✔
			Anairetes alpinus	EN	2016		✔
			Asthenes helleri	VU	2016		✔
			Chaetura pelagica	VU	2018		
			Cinclodes aricomae	CR	2016		✔
			Conopias cinchoneti	VU	2016		
			Cranioleuca marcapatae	VU	2016		✔
			Leptasthenura xenothorax	EN	2016		✔
			Leptosittaca branickii	VU	2016		✔
			Nothocercus nigrocapillus	VU	2016		✔
			Nothoprocta taczanowskii	VU	2018		✔
			Primolius couloni	VU	2018		
			Spizaetus isidori	EN	2016		✔
			Zimmerius cinereicapilla	VU	2016		
		Mammals	*Akodon surdus*	VU	2017		
			Hippocamelus antisensis	VU	2016		
			Lagothrix lagothricha	VU	2020		
			Leopardus jacobita	EN	2014		
			Mazama chunyi	VU	2016		
			Mormopterus phrudus	VU	2015		
		Plants	*Cedrela odorata*	VU	2017		
			Gentianella vargasii	VU	2018		
Peru	Abra Pardo de Miguel	Amphibians	*Pristimantis rufioculis*	VU	2017		
			Pristimantis schultei	VU	2017		
		Birds	*Chaetocercus bombus*	VU	2016		
			Chaetura pelagica	VU	2018		
			Conopias cinchoneti	VU	2016		
			Cranioleuca curtata	VU	2016		

Country	KBA	Group	Species	IUCN Global Threat	Last IUCN assessment	Last IUCN record	GBIF records since 2010
			Grallaria przewalskii	VU	2016		
			Heliangelus regalis	EN	2016		
			Herpsilochmus axillaris	VU	2016		
			Leptosittaca branickii	VU	2016		
			Nothocercus nigrocapillus	VU	2016		
			Patagioenas subvinacea	VU	2016		
			Picumnus steindachneri	EN	2016		
			Sericossypha albocristata	VU	2018		
			Tangara argyrofenges	VU	2018		
			Thamnophilus tenuepunctatus	VU	2016		
			Tinamus tao	VU	2018		
			Zimmerius cinereicapilla	VU	2016		
		Mammals	*Aotus nancymaae*	VU	2017		
			Lagothrix flavicauda	CR	2019		
			Pteronura brasiliensis	EN	2014		
			Tapirus terrestris	VU	2018		
			Tayassu pecari	VU	2012		
			Vampyressa melissa	VU	2015		
		Plants	*Brachyotum angustifolium*	VU	2018		
			Cedrela odorata	VU	2017		
Peru	Carpish	Amphibians	*Ctenophryne carpish*	EN	2017		
			Gastrotheca stictopleura	EN	2017		✔
			Nymphargus mixomaculatus	CR	2017		
			Phrynopus daemon	EN	2017		✔
			Phrynopus dagmarae	EN	2017		
			Phrynopus horstpauli	EN	2017		
			Phrynopus kauneorum	EN	2017		
			Phrynopus vestigiatus	EN	2017		✔
			Pristimantis pulchridormientes	EN	2018		
			Rhinella chavin	EN	2018		
			Telmatobius brevirostris	EN	2017		
			Telmatobius punctatus	EN	2017		
		Birds	*Agriornis albicauda*	VU	2016		
			Ara militaris	VU	2016		
			Chaetura pelágica	VU	2018		

Country	KBA	Group	Species	IUCN Global Threat	Last IUCN assessment	Last IUCN record	GBIF records since 2010
			Cnemathraupis aureodorsalis	EN	2016		✔
			Conopias cinchoneti	VU	2016		✔
			Cranioleuca curtata	VU	2016		
			Doliornis sclateri	VU	2016		✔
			Herpsilochmus axillaris	VU	2016		
			Leptosittaca branickii	VU	2016		✔
			Neomorphus geoffroyi	VU	2016		
			Nothocercus nigrocapillus	VU	2016		
			Patagioenas subvinacea	VU	2016		✔
			Poospiza rubecula	EN	2016		
			Primolius couloni	VU	2018		✔
			Sericossypha albocristata	VU	2018		✔
			Spizaetus isidori	EN	2016		✔
			Tinamus tao	VU	2018		✔
			Zaratornis stresemanni	VU	2016		
			Zimmerius cinereicapilla	VU	2016		
		Mammals	*Ateles chamek*	EN	2015		
			Hippocamelus antisensis	VU	2016		
			Marmosops juninensis	VU	2015		
			Tapirus terrestres	VU	2018		
			Tayassu pecari	VU	2012		
			Vampyressa melissa	VU	2015		
		Fish	*Chaetostoma marmorescens*	VU	2014		
		Plants	*Cedrela odorata*	VU	2017		
			Krapfia haemantha	VU	2018		
			Themistoclesia peruviana	VU	2018		
		Reptiles	*Stenocercus chinchaoensis*	VU	2014		
			Stenocercus torquatus	VU	2014		
Peru	Cordillera de Colán	Amphibians	*Excidobates mysteriosus*	EN	2017		
			Hyloxalus insulatus	VU	2018		
			Pristimantis serendipitus	EN	2016		
		Arthropods	*Parides phalaecus*	VU	2019		
		Birds	*Ara militaris*	VU	2016		
			Chaetura pelagica	VU	2018		
			Cranioleuca berlepschi	VU	2016		
			Cranioleuca curtata	VU	2016		
			Grallaria przewalskii	VU	2016		✔

Country	KBA	Group	Species	IUCN Global Threat	Last IUCN assessment	Last IUCN record	GBIF records since 2010
			Grallaricula ochraceifrons	EN	2016		
			Heliangelus regalis	EN	2016		
			Heliodoxa gularis	VU	2016		
			Herpsilochmus axillaris	VU	2016		
			Nothocercus nigrocapillus	VU	2016		✔
			Patagioenas oenops	VU	2016		
			Patagioenas subvinacea	VU	2016		✔
			Phlogophilus hemileucurus	VU	2016		
			Picumnus steindachneri	EN	2016		✔
			Poecilotriccus luluae	EN	2016		✔
			Sericossypha albocristata	VU	2018		✔
			Spizaetus isidori	EN	2016		
			Tangara argyrofenges	VU	2018		
			Thamnophilus tenuepunctatus	VU	2016		
			Tinamus tao	VU	2018		
			Touit stictopterus	VU	2016		
			Wetmorethraupis sterrhopteron	VU	2016		
			Xenoglaux loweryi	EN	2016		✔
			Zimmerius cinereicapilla	VU	2016		
		Mammals	*Aotus nancymaae*	VU	2017		
			Ateles belzebuth	EN	2019		
			Lagothrix flavicauda	CR	2019		
			Tapirus terrestris	VU	2018		
			Tayassu pecari	VU	2012		
			Thomasomys rosalinda	EN	2016		
			Vampyressa melissa	VU	2015		
		Plants	*Browningia altissima*	VU	2011		
			Cedrela odorata	VU	2017		
Peru	Kosnipata Carabaya	Amphibians	*Allobates alessandroi*	EN	2018		
			Atelopus tricolor	VU	2004		
			Boana gladiator	VU	2017		
			Bryophryne cophites	EN	2016		
			Centrolene sabini	VU	2017		
			Gastrotheca excubitor	VU	2017		
			Gastrotheca nebulanastes	EN	2017		✔
			Oreobates amarakaeri	VU	2017		

Country	KBA	Group	Species	IUCN Global Threat	Last IUCN assessment	Last IUCN record	GBIF records since 2010
			Pristimantis cosnipatae	CR	2017		
			Telmatobius timens	CR	2013		
		Birds	*Agamia agami*	VU	2016		
			Agriornis albicauda	VU	2016		
			Ara militaris	VU	2016		✔
			Asthenes helleri	VU	2016		✔
			Chaetura pelagica	VU	2018		
			Cinclodes aricomae	CR	2016		
			Cranioleuca curtata	VU	2016		✔
			Cranioleuca marcapatae	VU	2016		✔
			Euchrepomis sharpei	EN	2016		✔
			Leptosittaca branickii	VU	2016		✔
			Nothocercus nigrocapillus	VU	2016		✔
			Nothoprocta taczanowskii	VU	2018		✔
			Patagioenas subvinacea	VU	2016		✔
			Primolius couloni	VU	2018		✔
			Spizaetus isidori	EN	2016		✔
			Tinamus osgoodi	VU	2018		✔
			Tinamus tao	VU	2018		✔
			Zimmerius cinereicapilla	VU	2016		✔
		Mammals	*Akodon surdus*	VU	2017		
			Lagothrix lagothricha	VU	2020		
			Leopardus jacobita	EN	2014		
			Mazama chunyi	VU	2016		
			Tayassu pecari	VU	2012		
			Vampyressa melissa	VU	2015		
		Fish	*Attonitus bounites*	VU	2014		
		Plants	*Cedrela odorata*	VU	2017		
Peru	Lago Yanacocha	Amphibians	*Gastrotheca excubitor*	VU	2017		
		Birds	*Agriornis albicauda*	VU	2016		✔
			Anairetes alpinus	EN	2016		
			Asthenes helleri	VU	2016		
			Chaetura pelagica	VU	2018		
			Cinclodes aricomae	CR	2016		
			Cranioleuca marcapatae	VU	2016		
			Leptasthenura xenothorax	EN	2016		✔
			Primolius couloni	VU	2018		
			Spizaetus isidori	EN	2016		
		Mammals	*Akodon surdus*	VU	2017		
			Hippocamelus antisensis	VU	2016		
			Lagothrix lagothricha	VU	2020		
			Leopardus jacobita	EN	2014		

Country	KBA	Group	Species	IUCN Global Threat	Last IUCN assessment	Last IUCN record	GBIF records since 2010
			Mazama chunyi	VU	2016		
		Plants	*Cedrela odorata*	VU	2017		
			Gentianella vargasii	VU	2018		
Peru	Moyobamba	Amphibians	*Ameerega bassleri*	VU	2017		
			Atelopus pulcher	VU	2018		
			Atelopus seminiferus	EN	2017		
			Pristimantis ardalonychus	EN	2017		
			Pristimantis schultei	VU	2017		
		Birds	*Ara militaris*	VU	2016		
			Chaetocercus bombus	VU	2016		✔
			Chaetura pelagica	VU	2018		
			Conopias cinchoneti	VU	2016		✔
			Herpsilochmus axillaris	VU	2016		✔
			Nothocercus nigrocapillus	VU	2016		
			Patagioenas subvinacea	VU	2016		✔
			Picumnus steindachneri	EN	2016		✔
			Tangara argyrofenges	VU	2018		
			Thamnophilus tenuepunctatus	VU	2016		✔
			Tinamus tao	VU	2018		✔
			Zimmerius cinereicapilla	VU	2016		✔
			Zimmerius villarejoi	VU	2016		✔
		Mammals	*Aotus nancymaae*	VU	2017		
			Ateles belzebuth	EN	2019		
			Lagothrix flavicauda	CR	2019		
			Myrmecophaga tridactyla	VU	2013		
			Plecturocebus oenanthe	CR	2011		
			Priodontes maximus	VU	2013		
			Pteronura brasiliensis	EN	2014		
			Tapirus terrestris	VU	2018		
			Tayassu pecari	VU	2012		
			Vampyressa melissa	VU	2015		
		Plants	*Brachyotum angustifolium*	VU	2018		
			Cedrela odorata	VU	2017		
			Xanthosoma tarapotense	EN	2018		
Peru	Quincemil	Amphibians	*Allobates alessandroi*	EN	2018		
			Atelopus tricolor	VU	2004		

Country	KBA	Group	Species	IUCN Global Threat	Last IUCN assessment	Last IUCN record	GBIF records since 2010
			Boana gladiator	VU	2017		
			Oreobates amarakaeri	VU	2017		
		Birds	*Agamia agami*	VU	2016		
			Agriornis albicauda	VU	2016		
			Anairetes alpinus	EN	2016		
			Ara militaris	VU	2016		✔
			Asthenes helleri	VU	2016		
			Chaetura pelagica	VU	2018		
			Cinclodes aricomae	CR	2016		
			Cnipodectes superrufus	VU	2017		
			Cranioleuca curtata	VU	2016		✔
			Cranioleuca marcapatae	VU	2016		
			Euchrepomis sharpei	EN	2016		
			Herpsilochmus axillaris	VU	2016		✔
			Neomorphus geoffroyi	VU	2016		✔
			Nothocercus nigrocapillus	VU	2016		
			Patagioenas subvinacea	VU	2016		✔
			Primolius couloni	VU	2018		
			Spizaetus isidori	EN	2016		
			Tinamus osgoodi	VU	2018		✔
			Tinamus tao	VU	2018		✔
		Mammals	*Ateles chamek*	EN	2015		
			Lagothrix lagothricha	VU	2020		
			Leopardus jacobita	EN	2014		
			Mazama chunyi	VU	2016		
			Tapirus terrestris	VU	2018		
			Tayassu pecari	VU	2012		
			Vampyressa melissa	VU	2015		
		Fish	*Anablepsoides parlettei*	VU	2014		
			Ancistrus marcapatae	EN	2014		✔
			Attonitus bounites	VU	2014		✔
		Plants	*Cedrela odorata*	VU	2017		
			Werneria staticifolia	VU	2018		
Peru	Río Azara	Amphibians	*Atelopus tricolor*	VU	2004		
			Boana gladiator	VU	2017		
			Gastrotheca excubitor	VU	2017		
			Psychrophrynella bagrecito	CR	2017		
		Birds	*Agriornis albicauda*	VU	2016		
			Anairetes alpinus	EN	2016		
			Asthenes helleri	VU	2016		
			Chaetura pelagica	VU	2018		
			Cinclodes aricomae	CR	2016		

Country	KBA	Group	Species	IUCN Global Threat	Last IUCN assessment	Last IUCN record	GBIF records since 2010
			Cranioleuca marcapatae	VU	2016		✔
			Nothocercus nigrocapillus	VU	2016		
			Patagioenas subvinacea	VU	2016		
			Primolius couloni	VU	2018		
			Spizaetus isidori	EN	2016		
			Tinamus osgoodi	VU	2018		
			Tinamus tao	VU	2018		
		Mammals	*Hippocamelus antisensis*	VU	2016		
			Lagothrix lagothricha	VU	2020		
			Leopardus jacobita	EN	2014		
			Mazama chunyi	VU	2016		
			Tayassu pecari	VU	2012		
		Fish	*Anablepsoides parlettei*	VU	2014		
			Ancistrus marcapatae	EN	2014		✔
			Attonitus bounites	VU	2014		
		Plants	*Cedrela odorata*	VU	2017		
			Stangea paulae	VU	2018		
Peru	Río Utcubamba	Amphibians	*Excidobates mysteriosus*	EN	2017		
			Hyloxalus insulatus	VU	2018		
			Pristimantis schultei	VU	2017		
			Rhinella arborescandens	EN	2017		
			Telmatobius truebae	VU	2017		
		Arthropods	*Parides phalaecus*	VU	2019		
		Birds	*Ara militaris*	VU	2016		
			Chaetocercus bombus	VU	2016		✔
			Chaetura pelagica	VU	2018		
			Cranioleuca berlepschi	VU	2016		✔
			Cranioleuca curtata	VU	2016		
			Grallaria przewalskii	VU	2016		✔
			Heliangelus regalis	EN	2016		✔
			Heliodoxa gularis	VU	2016		
			Herpsilochmus axillaris	VU	2016		
			Leptosittaca branickii	VU	2016		✔
			Loddigesia mirabilis	EN	2016		✔
			Nothocercus nigrocapillus	VU	2016		✔
			Patagioenas oenops	VU	2016		✔
			Patagioenas subvinacea	VU	2016		✔
			Picumnus steindachneri	EN	2016		✔

Country	KBA	Group	Species	IUCN Global Threat	Last IUCN assessment	Last IUCN record	GBIF records since 2010
			Sericossypha albocristata	VU	2018		✔
			Spizaetus isidori	EN	2016		✔
			Tangara argyrofenges	VU	2018		
			Thamnophilus tenuepunctatus	VU	2016		✔
			Tinamus tao	VU	2018		✔
		Mammals	*Aotus nancymaae*	VU	2017		
			Lagothrix flavicauda	CR	2019		
			Tapirus terrestris	VU	2018		
			Tayassu pecari	VU	2012		
			Thomasomys rosalinda	EN	2016		
			Vampyressa melissa	VU	2015		
		Plants	*Brachyotum angustifolium*	VU	2018		
			Browningia altissima	VU	2011		
			Cedrela odorata	VU	2017		
Peru	San José de Lourdes	Arthropods	*Parides phalaecus*	VU	2019		
		Birds	*Ara militaris*	VU	2016		
			Chaetura pelagica	VU	2018		
			Conopias cinchoneti	VU	2016		
			Cranioleuca curtata	VU	2016		
			Heliangelus regalis	EN	2016		
			Heliodoxa gularis	VU	2016		
			Herpsilochmus axillaris	VU	2016		
			Lathrotriccus griseipectus	VU	2016		
			Patagioenas oenops	VU	2016		✔
			Patagioenas subvinacea	VU	2016		✔
			Spizaetus isidori	EN	2016		
			Synallaxis maranonica	CR	2018		
			Thamnophilus tenuepunctatus	VU	2016		✔
			Tinamus tao	VU	2018		
			Touit stictopterus	VU	2016		
		Mammals	*Mazama rufina*	VU	2015		
			Tapirus terrestris	VU	2018		
			Tayassu pecari	VU	2012		
			Thomasomys pyrrhonotus	VU	2008		
			Thomasomys rosalinda	EN	2016		
		Plants	*Cedrela odorata*	VU	2017		
		Reptiles	*Polychrus peruvianus*	VU	2014		

We used distributions of some reptiles, soon to be published in IUCN, which have been adjusted as part of the process coordinated by IUCN-DC and financed by CEPF (M. Tognelli, unpublished data).

The Critical Ecosystem Partnership Fund (CEPF) is a joint initiative of l'Agence Française de Développement, Conservation International, the European Union, the Global Environment Facility, the Government of Japan and the World Bank.

Offices located at:
Conservation International
2011 Crystal Drive, Suite 600
Arlington, VA 22202 USA
www.cepf.net

CRITICAL ECOSYSTEM PARTNERSHIP FUND