Galleries Commit X Art to Acres Land Conservation

Conservation Partners

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About the Project
In partnership with Art to Acres, Galleries Commit is supporting the creation of a new permanent nationally protected area sized at 198,752 acres, or 80,432 hectares, called the Chuyapi-Urusayhua Regional Conservation Area in Peru. This old-growth, intact cloud forest stores approximately 30,531,002 tonnes of carbon dioxide (tCO2), or 153 tCO2 per acre, and is classified as a high biodiversity area. This Amazonian cloud forest is a part of the last 1% of cloud forests that remain globally. It is deemed an Intact Forest Landscape (IFL) with high species irreplaceability (high levels of unique species). This is a community-requested and community-managed conservation project that provides habitat and migration opportunities for highly endangered mammals.

The funds support the formal conservation designation status at a national level. The grant funds the community surveys, biodiversity studies, mapping, legal costs and local-leadership employees. The local project leader in Peru is the Amazon Conservation Association, with support from Amazon Andes Fund and Global Wildlife Conservation in the United States. Donation from the art community triggers 200% in matching funds, and the associated U.S. administrative, legal, accounting and travel costs are donated by the partner organizations. The donation is tax deductible.

Intact forest landscapes are the most carbon-dense and biodiverse terrestrial ecosystems, with additional benefits to society and to the economy.[1] Forests are essential for carbon dioxide removal (CDR), necessary to keep the global temperature rise within 1.5 or 2.0°C range specified by the Paris Climate Agreement in 2015. Supporting existing forests (proforestation) optimizes CDR while mitigating the risks associated with climate change and protecting biodiversity, air, land and water. Approximately 90 percent of the global terrestrial biomass carbon is tied up in forests, of which half is in tropical and subtropical forests.

Land conservation is the process of protecting natural land. Leading scientists have set a global aim of protecting at least 30 percent of lands and waters by 2030 to support climate balance and to protect air, water and biodiversity. Broadly known as "natural climate solutions," wetlands, grasslands, natural forests and agriculture are referred to as “carbon sinks” for their great capacity to absorb carbon. If the forest is

[1] https://frontiersin.org/articles/10.3389/ffgc.2019.00027/full

well managed, it can grow for centuries; and we can consider the sequestration "durable" as long as that management persists and is monitored.[2]

Old-growth trees are the oldest and most efficient technology for sequestering – capturing and storing – atmospheric carbon dioxide. When a tree makes oxygen (O_2), it splits a carbon dioxide (CO_2) molecule, releasing the O_2 molecule and storing the carbon (C) molecule underground in its biomass, referred to as "sequestration or sequestered carbon." When a landscape is deforested, the trees no longer remove carbon dioxide from the atmosphere and the forest system's underground sequestered carbon is released into the atmosphere. Old-growth trees store (sequester) the most carbon with 70 percent accumulated in the last half of their lives and 40 percent of their lifetime's worth of carbon in just the last quarter of their lives.[3] This points to the benefit of conserving old age trees in approaches to reach net carbon emissions. As trees age, their climate benefit grows.

Global warming is the result of heat-trapping greenhouse gases, such as carbon dioxide, methane, nitrous oxide and fluorinated gases, accumulating in the atmosphere and absorbing and emitting radiant energy. Greenhouse gases (GHGs) are released through activities such as deforestation, industrial processes and the burning of fossil fuels.[4] It is central for individuals and corporations to make commitments to reduce their emissions to help meet these targets and keep our global greenhouse gas emissions in 2030 to 25–30 GtCO2e yr−1 and reach net zero by 2050. Pathways to this include legal implementation, advocacy, energy-demand reductions, decarbonization of electricity and other fuels, reduced land conversion, electrification of energy end use, deep reductions in agricultural emissions, and carbon dioxide removal with carbon storage on land or sequestration in geological reservoirs.[5] As of 2019, estimates from the Global Carbon Project showed that we only have 9% of our carbon budget left if aiming to achieve net zero by 2050.[6] Deforestation is estimated to cause 10 to 15 percent of the world's total carbon emissions. Permanently conserving large-scale primary forests that would otherwise be harvested or converted to agriculture lands, supports continued carbon removal from the atmosphere and maintained sequestration. Project Drawdown states, "By protecting as additional 828 to 1,150 million acres of forest, carbon dioxide emissions totaling 5.5-8.8 gigatons (GtCO2e) could be avoided by 2050."[7]

Making a nationally protected regional park is a slow process. This location has been in progress since 2013 with completion expected in 2021. Art to Acres completed a due diligence review in 2019 on the project in consideration of funding. Amazon Conservation Association (ACA), located in Peru and Washington, D.C., provides the local leadership in Peru, to complete the national status designation. ACA is working with the regional government and local communities to prepare the required studies and files to present to Peru's national government for the area's declaration, time and efforts supported by donor funds. ACA has a legacy of enduring conservation projects across 124 million acres of the southwest Amazon. Amazon Andes Fund (AAF), based in Washington, D.C., oversees the legal, grant-making and local partner processes, and is providing 100% in matching funds for this project.
Global Wildlife Conservation (GWC) oversees the accounting, sub-grant making and provides 100% matching funds. The long-term monitoring and management of this location is done through traditional conservation means: signage, rangers and conservation staff, and biannual biodiversity and satellite surveys courtesy of NASA, Planet and Global Forest Watch.

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[2] https://orbuch.com/carbon-removal/

[3] https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0181187

[4] https://epa.gov/ghgemissions/overview-greenhouse-gases

[5] https://ipcc.ch/sr15/

[6] https://earth.stanford.edu/news/global-carbon-emissions-growth-slows-hits-record-high#gs.l7ymx9

[7] https://drawdown.org/solutions/forest-protection

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FAQ

Q: Why is the Chuyapi-Urusayhua Regional Conservation Area important?
A: It is part of the remaining 1% of global cloud forests, a last chance mammal area and is a high-carbon sequestration location. See Annex A and B of this PDF for additional explanation on the location importance.

Q. What is the estimated size of the conserved location?
A. It is 198,752 acres or 80,432 hectares. See Annex A and B of this PDF for overview maps.

Q: What is carbon sequestration?
A: Carbon sequestration secures carbon dioxide – a heat trapping gas produced both in nature and by human activities – and removes it from the Earth's atmosphere. The two main types of carbon sequestration are biologic and geologic. Historically, annual carbon emissions have been captured by the Earth's forests, farms and grasslands at a rate of 25 percent and by the upper layer of the ocean at a rate of 30 percent. The remaining 45 percent stays in the atmosphere.[8] Broadly known as "natural climate solutions," carbon can be stored in wetlands, grasslands, natural forests, oceans and agriculture. These are known as "carbon sinks" for their great capacity to absorb more carbon than they release and store this carbon through a process referred to as "sequestration." See the About the Project overview for a review of carbon sequestration.

Q: May I read the location's carbon assessment?
A: Yes. See Annex B for a carbon assessment prepared by Terra Global.

Q: What is the carbon sequestration of this location?
A. The location is estimated to hold a total carbon measurement of 30,531,002 metric tonnes, or 153 tCOe2 per acre, in its above ground and below ground forest biomass. Based on 2018 annual deforestation rates in the region of 1/3 of 1 percent, the projected avoided deforestation emissions are 13,920 tCO2e per year. Thus, this conservation protects the location's total carbon, and annually avoids the estimated release of 13,920 tCO2e. See Annex B for a review of the carbon sequestration.

Q: Is this a carbon offset project?
A. No, this is not a retail carbon offset project. This is a donation to permanent land conservation that protects sequestered carbon.

Q: What is proforestation?
A: Proforestation refers specifically to supporting continuous intact forest growth uninterrupted by timber harvesting, a term coined by scientist William Moomaw. It is a natural climate solution that addresses climate mitigation and adaptation by prioritizing natural processes and regeneration in existing forests to optimize cumulative carbon and ecological complexity. See Annex A of this PDF for a further explanation on proforestation.

Q. What is a cloud forest conservation?
A. See Annex A of this PDF for an explanation of cloud forests, which is a sub-type of tropical forest.

Q: What is tropical forest conservation?

[8] https://climatechange.ucdavis.edu/science/carbon-sequestration/

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A: Only 6.5 percent of old-growth tropical forests are formally protected. See Annex A for a review of tropical forests and their importance to climate, biodiversity, clean air and global hydrology.

Q. What is Art to Acres?
A. Art to Acres is a 501c3 based in San Francisco, California that focuses on the conservation support for carbon-rich, biodiverse and intact environments that prioritize connectivity and migration. 100% of donor funds are restricted to the land conservation project and the non-profits' advisory board covers all remaining costs. See Annex C to learn more about Art to Acres.

Q. How can I learn more about the conservation partners?
A. The partners for this project are Amazon Conservation Association (ACA), Amazon Andes Fund (AAF) and Global Wildlife Conservation (GWC). The land selected for this project received a carbon review by Terra Global Capital (TGC). See Annex C for a review of the partners.

Q: What are the matching funds for this project?
A: The funds received are matched at 200%. See page 1 of this PDF for an explanation on funding support.

Q. How are the grant funds used?
A. This grant supports the formal creation and institution of national conservation status. The grant funds the process of designating the location to become permanently protected, including surveys, biodiversity studies, mapping, legal costs and local-leadership support. See page 1 of this PDF for a review on the grant composition.

Q. Is this charitable contribution tax deductible?
A. Yes, the donation is tax deductible and donors receive a tax deduction letter.

Q. Where is the location?
A. The central coordinates of the location are 72°54'2"W 12°52'43"S, which is situated in a mountainous cloud forest in Peru. Conservation of these mountaintops and forest will protect the surrounding watersheds, the main sources of water for the villages in Cusco's Santa Ana and Eharati districts. See Annex A and B of this PDF for maps.

Q. Will I receive conservation updates?
A. Yes, donors receive biannual conservation updates.

Q. Is this land conservation permanent?
A. Yes, the local receives permanent, national conservation protection and park ranger-based management funding. The creation of the Chuyapi-Urusayhua Regional Conservation Area was requested by the community in and around Cusco, Peru.

Q: Where can I learn more about global climate goals and carbon budgets?
A: The Intergovernmental Panel on Climate Change (IPCC), an intergovernmental body of the United Nations, provides objective, scientific information relevant to understanding the scientific basis of the risk of human-induced climate change and possible response options. Learn more about their work here: https://www.ipcc.ch. The Carbon Project has produced a well-researched atlas to visualize global carbon budgets and emissions: http://www.globalcarbonatlas.org/en/content/welcome-carbon-atlas.

Q: What is a contact email for further questions regarding this conservation support?
A: info@arttoacres.org

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Annex A:

PERMANENT LARGE-SCALE FOREST OLD-GROWTH CONSERVATION SUMMARY REVIEW COMPLETED: SEPTEMBER 24, 2020
Prepared by: Global Wildlife Conservation

Proposed Chuyapi-Urusayhua regional conservation area in Peru. Source: GWC, September 2020

Location
This area, located to the northwest of iconic Machu Picchu and ranging in altitude from 3,000 – 14,400 feet above sea level, was proposed for protection by the regional government and the people of Cusco, Peru. The large altitudinal gradient provides a variety of microhabitats that are needed to support the protection of species as the planet warms. The major forest type present is tropical Yungas, or cloud forests, including numerous types of tree ferns and over 30 species of orchid. A rapid biological inventory of the area in 2013 also found 145 bird species, 42 of mammals (including pumas, tiger cats, and spectacled bears), 13 of reptiles, 7 of amphibians, dozens of endemic and threatened species, and eight new species to science. Furthermore, these forests provide multiple ecosystem services such as pollination by hummingbirds (30 species), other small birds, bats, insects, etc., and protection of the headwaters of the Chuyapi, Cirialo, Cushireni, San Miguel and Vilcabamba rivers, which are the main sources of water for the villages in Cusco's Santa Ana and Eharati districts.

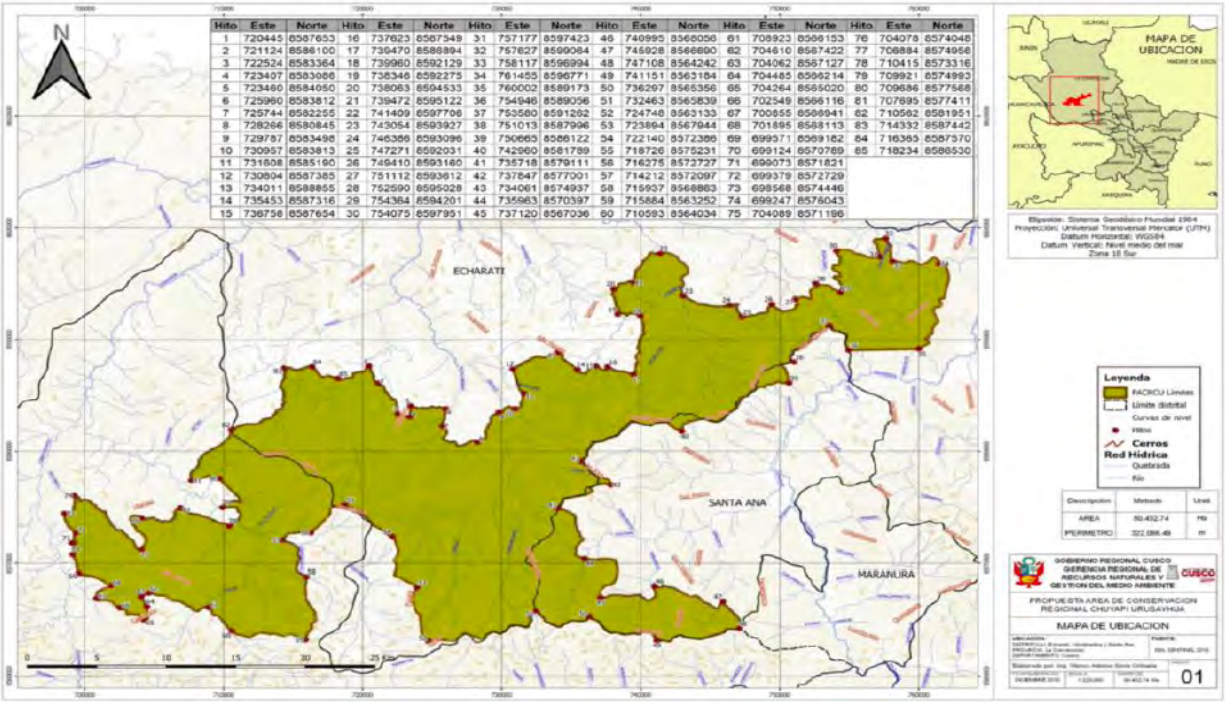
Peru is the fourth largest rainforest country in the world, and its Amazon forests are one of the most biodiverse areas of the world. The proposed Chuyapi-Urusayhua Regional Conservation Area in Cusco, Peru northwest of the iconic Machu Picchu, houses one of the densest carbon forests in Peru. This part of the Amazon rainforest is known for its variety of trees and canopy plants. Because of its varied geography and climate, Peru has a high level of biodiversity with 21,462 species of plants and animals

reported as of 2003; 5,855 of them endemic. Tropical forests and cloud forests are central in curbing climate change and the topography of this location is ideal habitat for the movement of species to locate higher and cooler ground as temperatures warm.[9]

Most of the forestland in the Peruvian Amazon is held by the state or occupied by indigenous peoples. Peru reformed its forest governance in 2000-2001 with changes in regulation and the introduction of long-term logging concessions in an attempt to promote sustainable forest management. While concession law favors local landholders, many argue that the system is corrupt and dominated by large timber companies who simply "enable" locals through a patronage system. Peruvian forest policy was further reformed in 2008-2010 following the introduction of a free trade treaty with the United States, where the U.S. specifically required improvements for assurance of legal forest trade. However, in adapting Peruvian law to the free trade treaty, several executive decrees created loopholes to convert forest land into agricultural land via reclassification of land use. This action was widely opposed by national indigenous groups, resulting in protests, roadblocks, and a violent standoff in the region of Bagua, Amazonas in 2009. Following this, controversial sections of the forest regulations were suspended, and a multi-stakeholder dialogue was initiated, including indigenous groups and NGOs. This location was proposed for protection by the regional government of Cusco and the Chuyapi-Urusayhua Regional Conservation Area technical proposal was completed and accepted by SERNANP (Peru's Protected Area Service) staff in early 2020. Protection is anticipated for the end of 2021.

Proforestation

Proforestation is the practice of supporting an pre-existing forest to grow toward its full ecological potential. It is a nature-based solution whereby existing forests are protected as intact ecosystems to foster continuous growth for maximal carbon storage and ecological and structural complexity. It is a powerful and immediate forest-based strategy. Proforestation, a term coined by scientist William Moomaw, addresses climate mitigation and adaptation by prioritizing natural processes.



Map 1. Project location and geospatial data. Source: AAF, September 2019.

[9] https://wri.org/blog/2018/10/numbers-value-tropical-forests-climate-change-equation

Geography

The proposed Chuyapi-Urusayhua Regional Conservation Area is located in the Cordillera de Vilcabamba of the Andes Mountains, ranging in altitude from 3,000 – 14,400 feet above sea level.[10] Only 1% of the global woodland consists of cloud forests, so the location is rare. Cordillera de Vilcabamba, small range of the Andes Mountains in south-central Peru, extending about 160 miles (260 km) northwestward from the city of Cusco. The range, marked by the erosive action of rivers that have cut deep canyons, rises to 20,574 feet (6,271 meters) at Mount Salccantay (Salcantay, or Sarkantay). The most atypical of the range's peaks is Pumasillo ("Puma's Claw"), at 19,915 feet (6,070 meters); it is not an isolated peak but the culmination of a large massif. Pumasillo is not visible from surrounding villages, and, although its existence was known, it was not accurately mapped until 1956. The Vilcabamba region, the site of Machu Picchu and other extensive ruins, was the last refuge for Incas escaping from the Spanish conquistadors in the 16th century.

Cloud Forest

Cloud forests are rare, confined to narrow band of altitude and latitude in which they can grow. They receive around 80 inches of rain a year on average in areas of high-altitude woodland with low cloud cover and a cool environment. A cloud forest, also called a water forest, primas forest, tropical yungas or tropical montane cloud forest (TMCF), is one type of a tropical forest, usually at the canopy level, formally described in the International Cloud Atlas (2017) as silvagenitus. Cloud forests account for one percent of the world's forest,[11] yet are important for biodiversity, allowing species to locate higher and cooler ground as temperatures warm. Cloud forests often exhibit an abundance of mosses covering the ground and vegetation, in which case they are also referred to as mossy forests. Mossy forests usually develop on the saddles of mountains, where moisture introduced by settling clouds is more effectively retained. Typically, there is a relatively small band of elevation in which the atmospheric environment is suitable for cloud forest development. This is characterized by persistent fog at the vegetation level, resulting in the reduction of direct sunlight and thus of evapotranspiration. Within cloud forests, much of the moisture available to plants arrives in the form of fog drip, where fog condenses on tree leaves and then drips onto the ground below.

Tropical Forest

Tropical forests are closed canopy forests growing within 28 degrees north or south of the equator. They receive more than 78 inches of rainfall per year[12] and are central in sequestering carbon and balancing climate. Once covering 12 percent of the world's landmass, tropical forests now cover 5 percent and harbor about 80% of the world's documented species. Once blanketing 12 percent of the world's landmass, tropical forests now cover just 5 percent. The world is losing area of forest at a rate of 64m acres a year, the vast majority of it tropical forest. The rate of deforestation has gone up by 43% in the past five years despite pledges made by governments (New York declaration on forests signed at the UN in 2014)[13] to reverse this. Increasing damage from logging and agriculture could turn the Amazon into a source of added carbon to the atmosphere, instead of one of the biggest absorbers of the gas, as soon as the next decade.[14] Despite promises of protection, only 6.5 percent of tropical forests are formally protected.[15] Not only is tropical forest protection of importance for mitigating global warming, it's imperative for biodiversity. These forests harbor about 80% of the world's documented species.

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[10] https://britannica.com/place/Cordillera-de-Vilcabamba

[11] https://news.mongabay.com/2014/06/study-finds-tiny-cloud-forests-have-big-biodiversity/

[12] https://panda.org/discover/our_focus/forests_practice/importance_forests/tropical_rainforest/

[13] https://theguardian.com/environment/2014/sep/23/un-climate-summit-pledge-forests-new-york-declaration

[14] https://scientificamerican.com/article/wildfires-could-transform-amazon-from-carbon-sink-to-source/

[15] https://sciencedaily.com/releases/2020/08/200810113220.htm

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Increasing the percentage of protected tropical forests is a vital piece in puzzle for minimizing the risks of climate change and preventing our tropical forests from becoming carbon emitters, allowing them to continue to sequester carbon.

Rainfall

Annual rainfall can range from 500 to 10,000 mm/year and mean temperature between 8 and 20 °C. The Yungas is a narrow band of forest along the eastern slope of the Andes Mountains from Peru, Bolivia, and northern Argentina. It is a transitional zone between the Andean highlands and the eastern forests. Like the surrounding areas, the Yungas belong to the Neotropical realm; the climate is rainy, humid, and warm. Yungas is the ecoregion of rain forest and montane forest from 1,000 to 3,500 m, so it is limited to the eastern side of the Andes. This region is considered as the most endemic biodiversity of Peru. The climate in this ecoregion varies from a tropical rainforest climate in the north to a subtropical highland climate in the south. The rainfall is often heavy and persistent condensation occurs because of the cooling of moisture-laden air currents which are deflected upward by the mountains. The trees in a cloud forest are typically short and crooked. Mosses, climbing ferns, lichens and epiphytes (air plants, such as orchids) form thick blankets on the trunks and branches of the trees. Begonias, ferns and many other herbaceous plants may grow to exceptionally large sizes in clearings. A forest of extremely stunted, moss-covered trees that occurs in tropical or temperate mountainous regions is sometimes known as an elfin woodland. The persistent fog at the vegetation level results in the reduction of direct sunlight and thus of evapotranspiration. Much of the moisture available to plants arrives in the form of fog drip, where fog condenses on tree leaves and then drips onto the ground below. Overall, cloud forests are our wettest forests on the planet and are ideal habitats for species during future climate change.

Biodiversity

As a megadiverse country, Peru has an exceptional diversity of flora. In the dense jungle rainforest, trees extend up to 60 meters high. Around its trunks, which extend up to 3 meters in diameter. The mountainous

Xanthosoma pubescens

Cedrela odorata

Puya raimondii

jungle contains a variety of trees with lichen, mosses and ferns providing a living soil structure for insects and soil animals. The Peruvian Yungas ecoregion contains over 3,000 species of plants, including 200 species of orchids. Orchid genera include *Epidendrum* and *Maxillaria*. Tree ferns (*Cyathea*) and bamboo (*Chusquea*) are common. Below 2,700 meters (8,900 ft), the forest includes species such as cedar

(*Cedrela*), trumpet tree (*Tabebuia*), and relatives of papaya (*Carica*). Above 3,500 meters (11,500 ft), there are scrublands and wet rocky thickets with shrubs, cactus, land orchids and the largest species of bromeliad, the *Puya raimondii*, as well as forests of *Podocarpus* conifers.

Peru has over 1,800 species of birds (120 endemic), 500 species of mammals, and more than 300 species of reptiles.[16] The Peruvian Amazon contains hundreds of mammals include rare species such as the Puma, Jaguar, Tapirs, Sloths, and Spectacled Bear. More than 300 species of birds are found in the cloud forests of Peru, of which 23 are threatened, including the royal sunangel hummingbird, the ochre-fronted antpitta, the marvellous spatuletail, and the rare long-whiskered owlet. Other species of birds are parrots, quetzal, tangar, trogon or oriole, toucans, tree climbers, hummingbirds, the black-headed ornamental bird and the red-fronted anteater. Peru's forests also harbor the endangered yellow-tailed wooly monkey and five frog species. The high elevation (6,500-11,000 feet), and remote location of these areas makes them some of the hardest to reach and therefore hardest to study ecosystems in the world. To date, scientists only believe a fraction of cloud forest tree and plant species have been discovered. Andean cloud forests are a top priority for biodiversity conservation because they are home to a remarkable number of endemic species that are found nowhere else on the planet. In Peru, more than one-third of the 270 endemic birds, mammals, and frogs are found in cloud forests.

Jaguar (*Panthera onca)*
The Jaguar is the largest cat of the Americas, and the only living representative of the genus *Panthera* in the New World. Historically it ranged from the southwestern US (where there are still some vagrants close to the Mexican border) through the Amazon basin to the Rio Negro in Argentina. Its extent of occurrence (EOO) is estimated at 9.02 million km², with its stronghold the rainforest of the Amazon basin, which comprises 57% of its total EOO. The Jaguar has been virtually eliminated from much of the drier northern parts of its range— Arizona and New Mexico in the United States, and extreme northern Sonora state in Mexico, as well as northern Brazil, the pampas scrub grasslands of Argentina and throughout. In 2002, Jaguars were estimated to occupy only about 46% of its historic range. With our improved knowledge of Jaguar range, this percentage is set at 51% currently. Sanderson *et al*. (2002) defined the most important areas for conservation of viable Jaguar populations (Jaguar Conservation Units or JCUs). These 51 areas cover 44.49 million km², or 49% of Jaguar range according to present calculations. Jaguar density in the Brazilian Pantanal has been estimated as 6.6-6.7 /100 km², or 10.3-11.7/100 km² depending on the method used (telemetry versus camera traps, respectively, Soislao and Cavalcanti (2006). In the Bolivian Amazon, Jaguar density was estimated at 2.8/100 km², and in the Colombian Amazon, Jaguar density was estimated at 4.5/100 km² and 2.5/100 km² (Amacayacu National Park and unprotected areas respectively). Estimates of Jaguar density are 2/100 km² in the savannas of the Brazilian Cerrado, 3.5/100 km² in the semiarid scrub of the Caatinga, and 2.2/100 km² in the Atlantic Forest, and 2.2-5 per 100 km² in the Bolivian Gran Chaco. The Atlantic Forest subpopulation in Brazil has been estimated at 200+/- 80 adults. Jaguar populations in the Chaco region of northern Argentina and Brazil, and the Brazilian Caatinga, are low-density and highly threatened by livestock ranching and persecution.

[16] http://peruwildlife.info/

The Jaguar has a stocky, heavy body with short massive limbs associated with reduced cursorial behavior and dense forest habitat, and robust canines and large head allowing a more powerful bite than other large cats. Mean body weight varies by up to 100% across their range, those living further from the equator tend to be larger. This extreme variation in size may reflect variation in the availability of large prey in different habitats: the largest Jaguars occur in open flood plains areas, the Llanos in Venezuela and the Pantanal in Brazil, and take the largest prey, and the smallest Jaguars inhabit the dense forest areas of Central America and Amazonia and take smaller prey. Jaguars are opportunistic hunters. Over 85 prey species (wild and livestock/domestic), including mammals, reptiles and birds, have been recorded in their diet across their geographic range. Jaguars take a wide variety of prey species but large-sized ungulates are preferred when available. The intake of large prey likely helps Jaguars save energy, since it is estimated that 50% of kills are larger prey on which they will feed for up to 4 days.

Males and females may come together for breeding opportunities at any time of the year. The female is in oestrus 6-17 day period, and gestation lasts 91-101 days (in captivity), after which the female gives birth to up to four cubs, usually two, which will stay with her for up to 24 months. Cubs are fully dependent on their mother's milk for the first 10-11 weeks and continue to suckle until 5-6 months old. Cycling could resume 2-3 weeks following lactational anestrus. However, inter-birth intervals documented in the wild are approximately two years. By 15-18 months, Jaguars travel and hunt independently within their mother's range, although they may still come together at kill sites. Jaguars are usually independent by the age of 24 months, however the age of dispersal or the social circumstances associated with it are poorly known. Dispersal does not appear to be linked with the onset of sexual maturity, estimated at 24-30 months for females and 36-48 months for males. The Jaguar is classified as Near Threatened, due to a suspected 20-25% decline over the past three generations (21 years) in area of occupancy, extent of occurrence, and habitat quality, along with actual or potential levels of exploitation. Given the inherent difficulty of assessing this species, the normally low density with which it occupies the landscape and the effects that small population and habitat degradations can have on the species, our minimum assessment of population decrease could be a significant underestimate. Jaguar populations are threatened by habitat

loss and fragmentation, killing for trophies/illegal trade in body parts, pro-active or retaliatory killings associated with livestock depredation, and competition for wild meat with human hunters.

Spectacled Bear (*Tremarctos ornatus)* The Andean Bear is the only extant bear species in South America and is endemic to the Tropical Andes. The distribution of this species is long (*ca* 4,600 km) and narrow (*ca* 200-650 km) in the mountains from Venezuela to Bolivia. From North to South, Andean bears are found in mountain ranges of Colombia; both Eastern and Western slopes of the Ecuadorian Andes; across the three Peruvian Andean Sierra de Perijá and Cordillera de Mérida in Venezuela; the Occidental, Central, and Oriental Andean mountain ranges, including a portion of the North Pacific coastal desert; and in the Eastern slope of the Tropical Andes in Bolivia.

Recently, presence of Andean bears in Northern Argentina has been confirmed by Cosse *et al*. (2014) through genetics. However, given that these presence points are up to 300 km south (straight line) of the known most-southerly population in Bolivia, they may represent vagrant individuals rather than resident populations. Wild populations are believed to be on decline due to habitat loss and fragmentation, and illegal killing. National assessments applying different approaches estimated 1,100-1,600 bears in Venezuela, 3,000-6,000 in Colombia, 1,200-2,000 in Ecuador, ~5,000 bears in Peru, and ~3,000 bears in Bolivia. These rather crude countrywide estimates, yielding a range-wide estimate of 13,000-18,000 bears (5-7 bears/100 km^2 over its 260,000 km^2 range), are reasonably consistent with three empirically-derived mark-recapture (re-sight) density estimates of 3-8 bears/100 km^2. Andean Bear altitudinal range extends from 200 to 4,750 m above sea level, with an area of occupancy covering approximately 260,000 km^2 along the Tropical Andes. The lower limit is on the Western Peruvian range; the upper limit is within Carrasco National Park in Bolivia.

The species inhabits a great variety of ecosystems along the Tropical Andes including Tropical dry forests, Tropical moist lowland and montane forests; Tropical dry and moist shrublands, and Tropical high altitude shrubland and grasslands. Seasonal shifts in habitat use due to changes in food availability have been reported. Andean bears are mostly found in Tropical moist forests and Tropical high-altitude grasslands, but it remains unclear whether bears can live entirely in high-altitude grasslands and paramo without access to forested areas. In the north coast of Peru, Andean bears inhabit a Tropical dry shrubland. Andean bears are omnivorous and have a suite of physical adaptations for this lifestyle. Anatomical skull and dentition adaptations to grind and a pseudo-thumb to aid in consuming a diet of fibrous, hard vegetative matter. Andean bears also opportunistically prey on mammals, including rabbits and mountain tapirs, but most notably free-ranging domestic cattle. Bromeliads and palm trees constitute

the most common food items in the diet of Andean Bears across the majority of their range. On a seasonal basis, fruits are key food sources for the species as they provide carbohydrates, protein and fat necessary to balance their diet.

Andean Bears are excellent climbers and commonly build tree platforms where they rest, feed on fruits and carcasses, as well as guard feeding areas. Activity patterns are mainly diurnal, but they vary seasonally and between geographic areas. As food is available all year-round in most parts of their range, Andean bears do not hibernate. Information on reproduction is limited for Andean Bears and has mainly come from captive individuals. The species is polyestrous, a facultative seasonal breeder and experiences

delayed implantation. In captivity, females show three to four oestrous cycles during a single breeding season with no seasonal ovarian activity. Mating has been recorded in the wild at various times of year but peaking between March and October. Litter size varies from one to four, with twins being most common, and may be related to female weight and hence food abundance. Field observations in Bolivia suggested that births occur two to three months before the peak of the fruit season, perhaps to allow mothers to leave the den with their cubs when fruits are abundant. In captivity, time of birth varies with latitude but births usually occur from February to September.

A landscape assessment of habitat suitability and connectivity carried out for this assessment identified ~30% of habitat as unsuitable to sustain viable Andean Bear populations. Key patches for sustainable populations of Andean Bears were defined as areas larger than 400 km^2 and within 15 km of the nearest patch. At the national level, Venezuela showed the greatest projected loss of key patches (70%), with only two of these key patches available to sustain its bear population. Peru, Colombia and Ecuador are projected to lose 31%, 29% and 27% respectively, and Bolivia 19%. Causes of this loss of key patch habitat is associated with human development activities that have not ceased, and in some areas may increase by allowing oil exploration and exploitation within some protected areas. Expansion of the agricultural frontier, inadequate agricultural practices and land/agrarian reforms; mining and oil exploitation, conversion of land to coca crops and the drug trade, have been the main drivers of the loss

and degradation of Andean bear habitat. Furthermore, as a consequence of habitat loss, human-bear conflicts are likely to increase resulting in reduced tolerance and escalating bear kills. Thus, even where a habitat patch is of sufficient size to maintain a bear population, human-caused mortality is likely to reduce bear density. Climate change projections for 2010-2039 by Tovar *et al*. (2013) indicate that all ecosystems inhabited by Andean Bears will exhibit a degree of loss: 30% loss for Tropical high-altitude grasslands, 24% for Tropical dry and moist shrublands, and 18% for Tropical moist lowland and montane forests. Based on the current state of the Andean Bear's habitat, the fact that many threats causing reduction and degradation of Andean Bear ecosystems have not ceased, and projected patterns of biodiversity shift caused by climate change, the species is vulnerable to widespread future decline. Andean Bear species' experts in the Bear Specialist Group considered all of these threats and provided estimates of rates of decline. Experts estimated rates of decline of >30% for each of the five range countries in the next 30 years and also in a 30-year time window overlapping the present (2000–2030). This qualifies the species for Vulnerable.

Carabaya Stubfoot Toad
(*Atelopus erythropus)*
This species is known from the Cordillera Carabaya on the Amazon versant of the Andes in the Regions of Puno and Cusco. Its presence in the Regions of Huánuco and Ucayali require further investigation but may have been confused with Atelopus siranus. It has an elevational range of 1,800–2,500 m asl. Its type locality is about 60 km from the border with Bolivia and many other species found at this locality are also found in Bolivia, so it is possible this species could occur there as well. The species has not been seen since 2004. It is possible that this species is already extinct, however if a population still exists it is thought to have less than 50 individuals. The type locality—at Santo Domingo in the buffer zone of Bahuaja Sonene National Park in Puno Region—was surveyed in November 2006, February-March and May-June 2007, and again in 2016 and 2017, but no records were made.

Once common within its range in Manu National Park, this species has not been observed since 1999 despite intensive monitoring along streams where they used to reproduce. In the Kosñipata Valley, in the buffer zone of Manu National Park, juveniles and adults were formerly found in leaf litter and along creeks from 1,900-2,000 m asl. Surveys in the same region during 2007-2009 and 2012-2016, were unable to detect any individuals. In 2004, surveys conducted in Megantoni National Sanctuary in Cusco Region detected two individuals over 14 person days. These 2004 reports are the last time the species has been seen, but no surveys to the same site have been made since then. This species occurs in cloud forests on the Amazonian versant of the Peruvian Andes. The species is not expected to be tolerant of habitat degradation. Adults are usually found in the vicinity of small streams and breeding takes place in streams. Listed as Critically Endangered (Possibly Extinct) given that no live individuals have been reported since 2004, despite intensive and ongoing searches in suitable habitat in historical localities.

Should the species still be extant, it is likely that it survives in low numbers, possibly less than 50 mature individuals.

Puma ***(Puma concolor)***
The geographic range of the Puma is the largest of any terrestrial mammal in the Western Hemisphere, from Canada through the US, Central and South America to the southern tip of Chile. While the Puma is an adaptable cat, being found in every major habitat type of the Americas, including the high Andes (5,800 m asl in southern Peru), it was eliminated from the entire eastern half of North America within 200 years following European colonization. A remnant Endangered subpopulation persists in Florida. Recent confirmations and suitable habitat in the Midwestern U.S. indicate attempts at recolonization.

The Canadian population was roughly estimated at 3,500-5,000 and the western US population at 10,000 in the early 1990s. The population of Central and South America is likely much higher, although it is unclear how abundant Pumas are in the dense rainforest of the Amazon basin (Nowell and Jackson 1996). The Florida subpopulation, numbering 100-180, is isolated, and has been supplemented by a reintroduction of pumas from Texas. In Brazil it is considered Near Threatened but subspecies outside the Amazon basic are considered Vulnerable. It is also considered Near Threatened in Peru, Argentina and Colombia, and Data Deficient (inadequately known) in Chile.

This species is found in a broad range of habitats, in all forest types, as well as lowland and montane desert. Several studies have shown that habitat with dense understory vegetation is preferred, however, Pumas can live in very open habitats with only a minimum of vegetative cover. Pumas co-occur with Jaguars in much of their Latin American range and may favor more open habitats than their larger competitor, although both can be found in dense forest. Pumas are capable of taking large prey, but when available small to medium-sized prey are more important in their diet (in tropical portions of the range). This is true of wild prey as well as livestock. In North America, deer make up 60-80% of the Puma's diet, and the mean weight of prey taken is 39-48 kg. In Florida, however, where deer numbers are low, Pumas take smaller prey including feral pigs, raccoons and armadillos, and deer account for only about 1/3 of the diet. Home range sizes of Pumas vary considerably across their geographic distribution, and the smallest ranges tend to occur in areas where prey densities are high and prey are not migratory. In North America, home range sizes ranged from 32-1,031 km2.

This species is listed as Least Concern because it is one of the most widely-distributed mammals in the Western Hemisphere. Although it has been extirpated from its former range in midwestern and eastern North America, it is attempting to recolonize this region and populations are healthy enough for regulated harvest in western North America. However, it is considered to be declining elsewhere in its range, and as a large carnivore intricately linked to other wildlife and habitat associations, from a social and political perspective its conservation and management presents numerous challenges.

Black-and-chestnut Eagle ***(Spizaetus isidori)***
This species has an extensive but narrow and altitudinally restricted linear distribution on the coastal

ranges of north-central Venezuela (Carabobo and Aragua) and north-eastern Colombia (Santa Marta Mountains), and from the subtropical slopes of the Andes from Venezuela (Mérida and Perijá Mountains) through Colombia, Ecuador and Peru to west-central Bolivia and north-western Argentina. It is thought to be rare and patchily distributed but its status is very poorly known. The total population is precautionarily estimated to include fewer than 1,000 mature individuals, with no more than 250 mature individuals in each sub-population. The population in Venezuela has been estimated in the low hundreds or perhaps 200 mature individuals, with probably fewer than 250 mature individuals in Bolivia. The population in Argentina may be small, and whilst there is an unquantified number in Peru, it remains rare. Opinions on the population in Colombia vary, with one population alone, in a large stretch of suitable habitat on the eastern slopes of the Andes in Colombia, from Huila to Meta department, thought to support a few hundred individuals, compared with an estimate of fewer than 100 adults in the country's total population. The species appears to be common in the Santa Marta

mountains and on the western slope of the Los Nevados National Park and around Ucumari and Monterredondo, although this species is mobile, with the same birds probably recorded multiple times in a single day. The population in Ecuador is thought to consist of a maximum of 200 mature individuals. The global population has been variously estimated at more than 1,000 individuals or fewer than this. It is therefore precautionarily placed in the band for 250-999 mature individuals, with no more than 250 mature individuals in each sub-population. Based on this, there are assumed to be c.370-1,500 individuals in total. However, a complete survey of this species throughout its range is needed to accurately quantify its global population. It is found on heavily forested mountain slopes, probably occurring mostly in large valleys, usually at 1,500-2,800 m, but recorded from sea-level to 3,500m.

It has been observed in some partially logged tracts of forest, but this is perhaps as a direct result of extensive primary forest loss in the subtropical zone. Despite such observations, it is considered that the species requires some undisturbed primary montane forest in at least part of its large home range. It has been recorded feeding on a variety of mammals and birds. Its breeding season in Colombia and Bolivia is thought to be between February and September (Ferguson-Lees and Christie 2001), and in Argentina between May and October. Chickens comprised over a third of prey items at one nest in Colombia, and 9% in Argentina.

Black-faced Black Spider Monkey
(Ateles chamek)
Black-faced Black Spider Monkey is found in the northern and central lowlands of Bolivia, western Brazil and north-eastern Peru. It occurs to the South of the Rio Amazonas-Solimões, west of the Rios

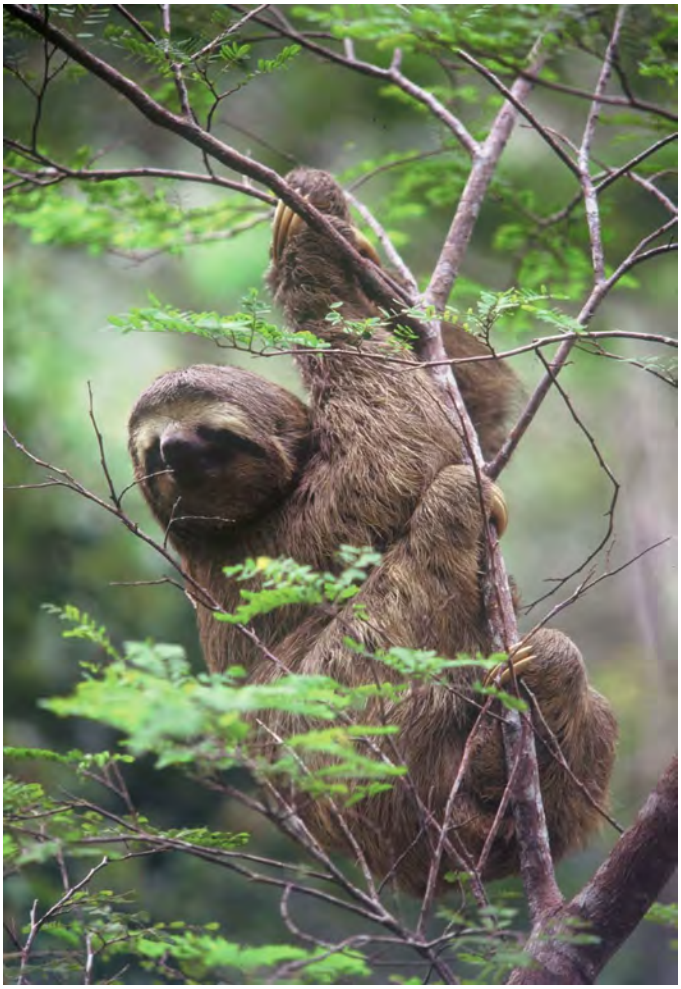
Tapajós-Teles and Pires, to the Río Ucayali in Peru (where it is replaced by *Ateles belzebuth* on the left bank of the lower Ucayali). It crosses the middle Ucayali south of the Río Cushabatay (a left bank tributary of the Ucayali), extending into the interfluvium of the Ríos Ucayali and Huallaga (Konstant and Rylands 2013). From there, it extends south along the eastern Cordillera into Bolivia, south of the Río Madre de Dios, south to about 17ºS, and from there extending north-east through the Noel Kempff Mercado National Park (Wallace *et al*. 1998), into the states of Rondônia and Mato Grosso, Brazil, to the left bank of the Rio Teles Pires and Rio Tapajós. Rabelo *et al*. (2014) recorded the species in the Mamirauá Sustainable Development Reserve (Amazonas, Brazil), on the northern bank of the Rio Solimões, extending the known distribution of *Ateles chamek* to the interfluvium of the Rios Solimões and Japurá. The Black-faced Black Spider Monkey is widespread and relatively common where not hunted for its meat. In Bolivia, *Ateles chamek* population densities are usually between five and 25 animals/km^2, reaching a maximum of 80 animals/km^2 at sites where not hunted. Where densities are highest, its distribution correlates with local habitat heterogeneity, such as areas with adjacent floodplains or terra firme forests. Factors determining different *Ateles* population densities in various habitats and study sites are discussed by McFarland Symington (1988b), who concluded that high densities depend on the abundance and productivity of certain key plant resources. The species occurs in lowland unflooded forest, semi-deciduous forest, riparian and flooded forest (várzea and igapó forests) with little or no hunting pressure. They are also found in transitional forest (forest to savanna) in southwestern Amazonia. In Bolivia, in the Noel Kempff Mercado National Park, Wallace *et al*. (1998) recorded *A. chamek* most often in tall forest (4.42 encounters per 10 km), followed by so-called saternejal forest (along the forest–savanna border, in the vicinity of small forest streams that undergo periodic flash floods; 2.49 encounters per 10 km). Garcia and Tarifa (1988) found *A. chamek* to be restricted to high forest in the Beni Biological Station. Otherwise, Alves (2013) recorded *A. chamek* in both unflooded terra firme and open/dense igapó clear-water flooded forests, but not in cerradão dense savanna woodland. This taxon is restricted to primary forest.

Spider monkeys travel and forage in the upper levels of the forest. They spend most time in the upper canopy, sometimes using the middle and lower strata but are rarely seen in the understory. Due to the use of the highest levels of the forest, they spend more time hanging from branches, moving by brachiation, arm swinging, and climbing, than walking or running on all fours. They are highly frugivorous and feed largely on the mature, soft parts of a very wide variety of fruits, which comprise about 80-90% of their diet and are found mainly in the emergent trees and upper part of the forest canopy. In the state of Rondônia (Brazil), Iwanaga and Ferrari (2001) recorded a diet consisting of 97.1% fruits, of which the Moraceae and Caesalpinaceae families account for 53.3% of the species exploited by *A. chamek*. Similar findings were presented by Felton *et al*. (2008) for the Guarayos Forest Reserve in Bolivia, where Moraceae was the most important plant family in the diet, both in terms of number of species and time spent feeding. They also eat young leaves and flowers (especially during periods of fruit shortage at the beginning of the dry season), but occasionally also young seeds, floral buds, pseudobulbs, aerial roots, bark, decaying wood, honey, and at rare occasions small insects such as termites and caterpillars. They play a significant role as seed dispersers. Van Roosmalen (1985) and van Roosmalen and Klein (1988)

found that *A. paniscus* was dispersing the seeds of at least 138 species (93.5% of all fruits species consumed) through their ingestion and subsequent defecation (endozoochory). Spider monkeys live in large, territorial, multi-male/multi-female groups of 37-55 individuals. However, they are rarely seen together, and almost always found travelling, feeding and resting in subgroups of varying size and composition (usually 2-4 individuals). The only persistent association is that of a mother and her offspring. Iwanaga and Ferrari (2002) recorded a mean (± SE) group size of 3.34 ± 2.60 individuals (n = 219 sightings) at a number of localities in the state of Rondônia in Brazil. At Lago Uauaçú, in the lower Rio Purús region, Haugaasen and Peres (2005) observed a mean groups size of 6.0 individuals/group in terra firme forest, but 12.6 individuals/group in várzea forest. Often single group members travel on their own, and each female occupies a preferred "core area" within the group's home range. Klein and Klein (1976, 1977) estimated 259-388 ha home ranges with 20-30% overlap between groups for *A. belzebuth* in La Macarena National Park in Colombia. *Ateles* species are rarely seen in association with other primates, and if, they are occasional and ephemeral, resulting from the simultaneous occupation of fruiting trees.

Six estimated birth periods, spread throughout the year, were given by Klein (1971) for *Ateles belzebuth* (i.e., December, January, April, September, October and November). Spider monkeys apparently reach sexual maturity at 4-5 years of age. They give birth to a single offspring after a long gestation period of 226-232 days, with a minimum birth interval of 17.5 months (in captivity) or 28-30 months in the wild. Late maturation and long inter-birth intervals make it difficult for the species to recover from hunting and other threats. *Ateles chamek* is listed as Endangered as the species is estimated to have declined by at least 50% over the past 45 years (three generations) primarily due to hunting and habitat loss. The forests in the southern part of its range, particularly in the states of Rondônia and Mato Grosso (Brazil), are devastated along the agricultural frontier/arc of deforestation moving from south to north through the Brazilian Amazon. Cattle farming and forest loss are also widespread in northern Bolivia and south-eastern Peru. Major development projects (dams, highways and transmission lines) are potential future threats to the species with strong indications of a continued decline at the same rate over the next three

generations. Hunting and deforestation are widespread throughout the southern part of its range, mainly in Brazil.



Brown-throated Sloth (*Bradypus variegatus*)

Bradypus variegatus ranges from Honduras in the north, through southern Central America. In South America, it ranges from Colombia into western and southern Venezuela, and south into Ecuador, eastern Peru and Bolivia, into Brazil and northern Argentina (where it is now considered to be extirpated). Its distribution overlaps with *B. torquatus* in the central part of the Atlantic forest. In Brazil, the species currently occurs in forested areas of the Amazon, Atlantic forest, and possibly in the contact zones between these biomes and Cerrado. There are historical records of *B. variegatus* in the Caatinga biome. There are no confirmed records for *B. variegatus* in the Pantanal biome of Brazil, but the species might occur in the contact zones between this biome and the Amazon forest to the north. Additional field studies are necessary in order to properly define the current species distribution in the Cerrado, Caatinga and Pantanal. Recent phylogeographic studies reveal that *B. variegatus* from the Central American, Western Amazon and Atlantic forests constitute distinct and unique evolutionary units that are distinguishable by molecular and morphological traits. *Bradypus variegatus* has been recorded from a number of forest types including seasonal mesic tropical forest, semi-deciduous forest (inland Atlantic Forest), cloud forest, and lowland tropical forest. It inhabits cacao (*Theobroma cacao*) plantations in Costa Rica. This sloth species produces one litter of one infant at intervals of at least 19 months. Mating period varies depending on the year and geographical region, but occurs mainly in spring (i.e., from July to November in South America and from February to May in Central America).

The marine sloths of South America's Pacific coast became extinct at the end of the Pliocene following the closing of the Central American Seaway; this caused a cooling trend in the coastal waters which killed off much of the area's seagrass (and which would have also made thermoregulation difficult for the sloths, with their slow metabolism). Ground sloths disappeared from both North and South America shortly after the appearance of humans about 11,000 years ago. Evidence suggests human hunting contributed to the extinction of the American megafauna. Ground sloth remains found in both North and South America indicate that they were killed, cooked, and eaten by humans. Climate change that came with the end of the last ice age may have also played a role (although previous similar glacial retreats were not associated with similar extinction rates). Megalocnus and some other Caribbean sloths survived until about 5,000 years ago, long after ground sloths had died out on the mainland, but then went extinct when humans finally colonized the Antilles.

Annex B:

CARBON ASSESSMENT PREPARED FOR GALLERIES COMMIT
REVIEW COMPLETED: NOVEMBER 14, 2020
Prepared by: Terra Global Capital

Standing Carbon Estimates[17]
Land-use and Land cover Assessment
The shapefile for Chuyapi-Urusayhua was provided by the client. Land-use and Land cover (LULC) was gathered from the most ready-available detailed data is from 2011.[18] The Land Cover Map of Peru, prepared by the Ministry of the Environment, offers general characteristics and geographical distribution of the different types of plant cover existing in the country. Among the important cartographic information, the location and net area of the original Amazon forests located in different geoforms or landscapes are shown. The project area has the following LULC classes, which Montane Mountain Forest is the most representative class, covering around 62% of the total area:

LULC Class	ha	% of Project Area
Non-Amazon Forest Areas	6,657	8%
Altimontane Mountain Forest	8,615	11%
Basimontane Mountain Forest	4,836	6%
Montane Mountain Forest	49,936	62%
High Terrace Forest	32	0%
Shrub	26	0%
Altimontane Shrub	1,022	1%
Andean Pajonal	947	1%
River	8,215	10%
Lakes	150	0%
Total	80,436	100%

Table 1. Detailed LULC types in Chuyapi-Urusayhua from 2011.

Another data set for LULC is Peru's Forest Reference Emission Level (FREL).[19] This is a much more general dataset with higher inaccuracy. LULC of the FREL is displayed in the table below. The description of the LULC types found in the Project Area are described below. The description is from the Peru's submission of a Forest Reference Emission Level (FREL) for reducing emissions from deforestation in the Peruvian Amazon, and although there are other LUCL types in Peru, these forest types are specifically found in the area."

Selva Alta Accesible, Selva Alta Difícil, Sierra and Biomass Distinctions
This eco-zone covers parts of the departments of Amazonas and Cajamarca in the North and Puno in the South. Elevations in the "Selva Alta Accessible" (Accessible High Forest) range from 500 to 3,800 m.a.s.l. The name of this eco-zones highlights that access to it is facilitated by many roads that are generally in good shape and passable by truck. Forests in this eco-zone include tall trees up to 35 meters at the lower elevations and small trees up to 10 meters at the highest elevations. "Selva Alta Difícil"

17

18 https://geogpsperu.com/

19 https://redd.unfccc.int/files/frel__submission_peru_modified.pdf

(Difficult High Forest) is characterized by hilly terrain with steep slopes so that it remains mostly protected due to its difficult access conditions. Many areas of this zone are declared as Protected Natural Areas. Physiognomically and floristically, this eco-zone is similar to the "Selva Alta Accessible." These are the most pristine areas of cloud forest. The "Sierra" (Mountain range) represents a mountainous region where forests can be found above 2,000 and below 3,800 m.a.s.l. from the North of the country, in the departments of Piura and Cajamarca, down to the South, in the departments of Puno and Tacana. Most of its vegetation are grasslands and paramos. Forest in this region have small trees, are fragmented and are often highly intervened. Map 2 shows generalized LULC types in Chuyapi-Urusayhua from FREL 2016.

Standing carbon was identified using Peru's Forest Reference Emission Level (FREL). Found here: https://redd.unfccc.int/files/frel_submission_peru_modified.pdf. Table 6 within the FREL describes general biomass of eco-zones in Peru.

Eco-zone	Above-ground biomass			Below-ground biomass			Total living tree biomass		
Name	Average	95% C.I.		Average	95% C.I.		Average	95% C.I.	
Selva Alta Accesible	297.33	277.28	317.4	77.7	73	82.4	375	350.3	399.7
Selva Alta Difícil	344.88	322.51	367.2	88.7	83.5	93.8	433.6	406.1	461
Selva Baja	410.58	399.71	421.4	103.6	101.1	106	514.1	500.8	527.4
Zona Hidromórfica	247.1	203.81	290.4	65.9	55.5	76.1	313	259.3	366.5

Table 2. Estimated average carbon stocks per eco-zone (in tCO2-e ha-1) Source: Peru FREL, June 2016.

Carbon Assessment and Deforestation Rate Reduced Emissions

Based on Peru's FREL, the flowing data was assumed. A total of 30,531,002 tCO2e are expected to exist on Chuyapi-Urusayhua Regional Conservation Area. This equates to 370 tCO2e per hectare (153 per acre) for above ground and below ground trees.

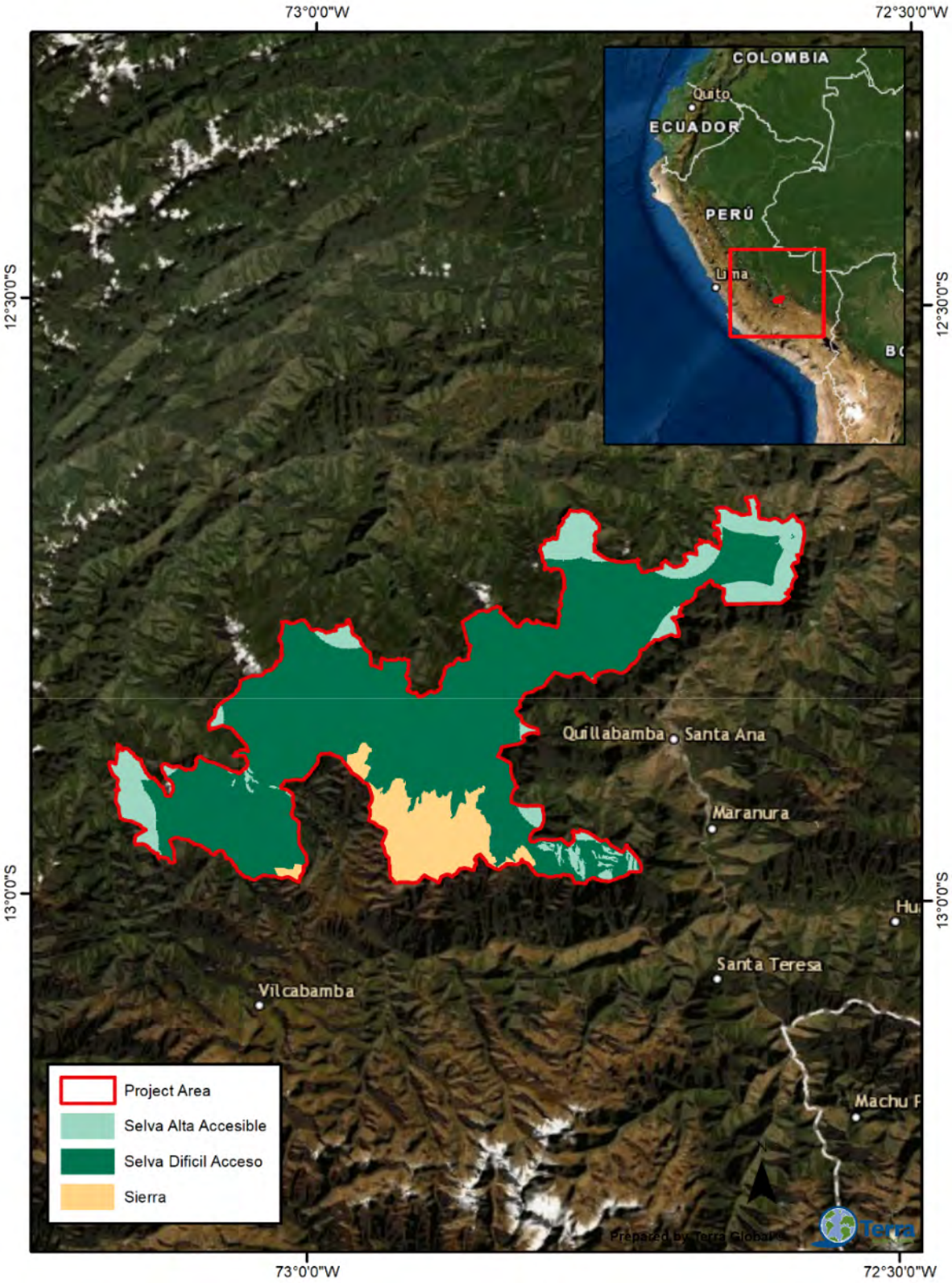
Eco-zone	ha	tCO2e
Selva Alta Accesible	11,670	4,376,250
Selva Alta Difícil	60,320	26,154,752
Sierra (non-forest)	8,448	N/A
Total:	80,438	30,531,002

Table 3. Estimated total carbon stocks per eco-zone (in tCO2-e ha-1) Source: Peru FREL, June 2016.

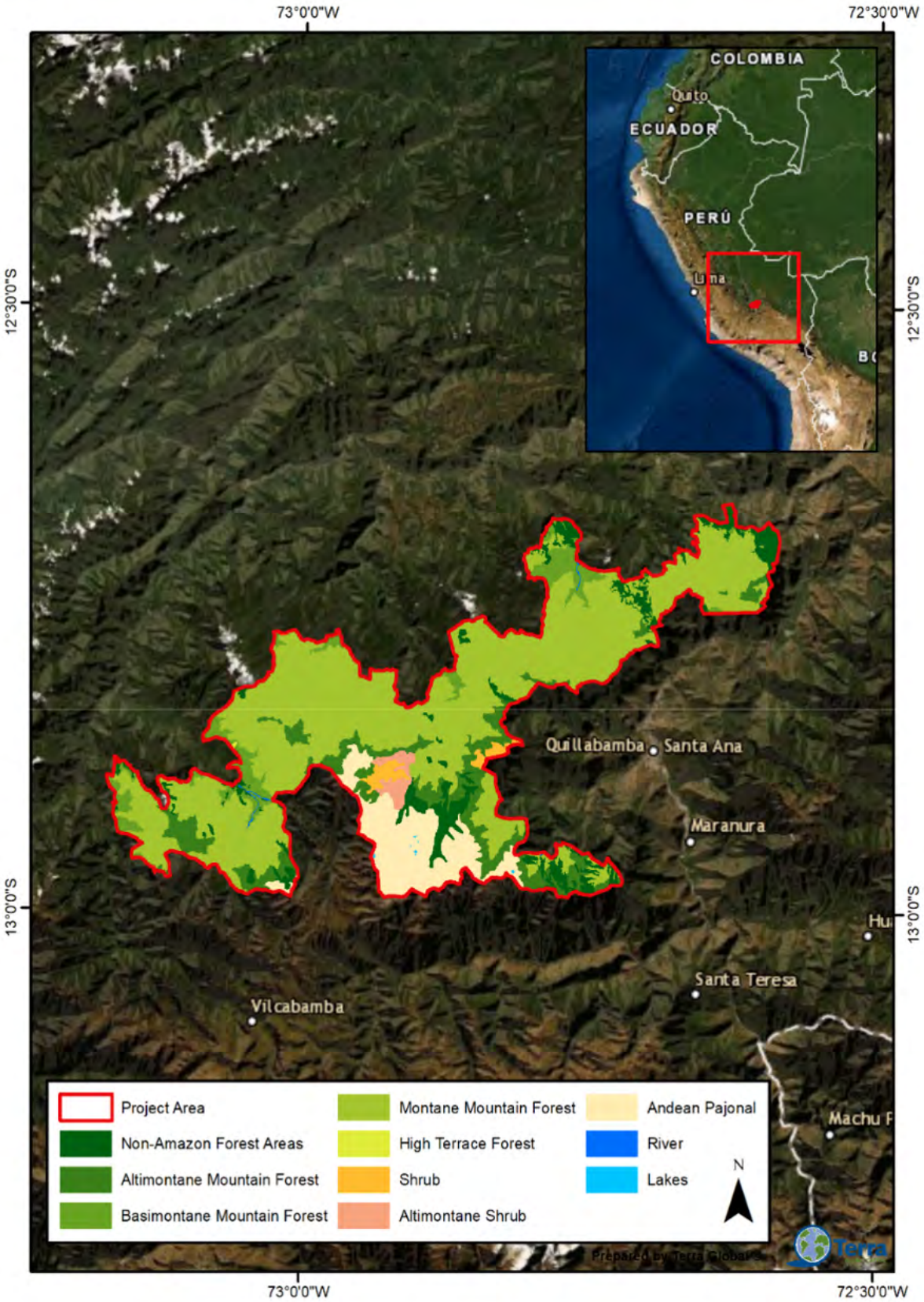
In 2018, the department of Cusco registers a loss of 9,643 ha of forest. The extent of the Amazon rainforest in 2018 is 3,063,940 ha and occupies 42.5% of the department. On average, the annual loss of forest, between 2001 - 2018, is 4,636 ha. In the district of La Convención, where the project area is located, the forest area in 2018 is 2,421,164 ha and registers a loss of forest for that same year of 7,724 ha.[20] The Ministry of the Environment reports for the year 2014 3,710,086 ha of forest and an average annual loss between 2010 and 2014 of 3,964 ha in the department of Cusco. Using the deforestation rate in 2018 in the district of La Convención of 0.319% and applying it to the forest in the project area most a risk of deforestation, Selva Alta Accesible, this would generate 13,920 tCO2e per year in emissions without protection.[21]

[20] http://bosques.gob.pe/archivo/Apuntes-del-Bosque-N1.pdf

[21] http://infobosques.com/portal/biblioteca/cuantificacion-y-analisis-de-la-deforestacion-en-la-amazonia-peruana-en-el-periodo-2010-2011-2013-2014/



Map 2. Ecozone types in Chuyapi-Urusayhua. Source: TGC, November 2020.



Map 3. LULC types in Chuyapi-Urusayhua. Source: TGC, November 2020.

Annex C:

Partner Organization Bios

Art To Acres
(AA) supports the art community in large-scale, permanent climate-based forest conservation.

Artist-founded in 2017, the initiative has supported the conservation of twenty-two million acres of carbon-dense landscapes on behalf of artists, galleries and institutions. Administrative and travel costs are paid by the non-profit board; 100% of donated funds go to the land conservation acquisition selected by the donor. The initiative oversees the due diligence, project research and matching funds to support conservative and scalable results.

Amazon Andes Fund
https://www.andesamazonfund.org/
(AAF) oversees the grant-making and local partner processes and provides 100% in matching funds.

AAF is a Washington, D.C. based non-profit and conserves the biodiversity, ecosystems, and environmental health of the Andes and Amazon. They establish and expand protected areas so that the indigenous cultures and nature can flourish and promote a clear path to a strong, healthy future for the lands they protect. Their team of devoted experts works arm-in-arm with indigenous peoples and other communities to advance AAF's vision and they award grants to nonprofits and institutions and invest in improved management of natural landscapes and support environmental education. The organization has supported the conservation of 30 million acres of forest in South America over the past 5 years.

Amazon Conservation Association
https://www.amazonconservation.org/
(ACA) is doing the local leadership in Peru for this project to complete the national conserved status.

Making a nationally protected regional park is a slow process. This location has been in progress for 7 years, with completion due in 2021. ACA has supported the biodiversity surveys, map-making, legal reviews, government meetings and all processes in-country for this project. ACA has achieved enduring conservation across 124 million acres of the southwest Amazon to protect biodiversity and ensure functionality, connectivity, and resilience of the ecosystem for both people and nature. They protect critical ecosystems and biodiversity by creating and strengthening protected areas, ensuring landscape connectivity essential for species survival, and directly addressing threats and are located in Peru and Washington, D.C.

Global Wildlife Conservation
https://www.globalwildlife.org/
(GWC) oversees the accounting, sub-grant making and provides 100% in matching funds.

GWC conserves the diversity of life on Earth by safeguarding wildlands, protecting wildlife and supporting guardians. They maximize our impact through scientific research, biodiversity exploration, habitat conservation, protected area management, wildlife crime prevention, endangered species recovery, and conservation leadership cultivation. The single biggest threat to biodiversity and the survival of wildlife worldwide is deforestation and the degradation of wildlands. Protection of the last great forests is by far the most cost-effective way of addressing many of our global problems, from climate change to freshwater availability. The need to invest in their protection is more urgent than ever.

Annex D:
Chuyapi-Urusayhua Regional Conservation Area in pictures
Photos courtesy of GWC, AAF, ACA, and Panthera