

ParksWatch
Protected Area Profile – Peru

Huascarán National Park



Author: Diego Shoobridge

Field support provided by: Guido Vidal Stiegler

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Translation: Amanda Vanega

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Location: Department of Ancash

Year created: 1975

Area: 340,000 hectares

Ecoregion: Central Andean Wet Puna

Habitats: Montane tropical grasslands, Humid Montane Tropical Forest, Very Humid Sub-Andean Paramo, Pluvial Andean Tropical Tundra, Very Humid Montane Tropical Forest, Pluvial Sub-Andean Tropical Paramo, Snow-Covered Tundra



Summary

Description

Rugged Huascarán National Park spanning 340,000 hectares was created in 1975. It was internationally recognized as a Biosphere Reserve under UNESCO's Man and the Biosphere program in 1977 and inscribed on the World Heritage List in 1985. The park is situated in Cordillera Blanca; it is flanked to the east by Callejón de Conchucos valley and to the west by Callejón de Huaylas valley. Snow-capped peaks of majestic heights reaching between 5,000 m and 6,768 m altitude, deep ravines carved out by glacial fluvial erosion, and innumerable sparkling lagoons are all features of this incredible park, which is unparalleled in its beauty.

Biodiversity

Many rare and endangered flora and fauna species inhabit the park. The vicuña (*Vicugna vicugna*), spectacled bear (*Tremarctos ornatus*), and Andean condor (*Vultur gryphus*) are its most emblematic species. Other important mammals include whitetail deer (*Odocoileus virginianus*), Incan cougar (*Puma concolor incarum*), northern viscacha (*Lagidium peruanum*), and Andean fox also called culpeo (*Pseudalopex culpaeus*), among others. Native flora of the region is particularly diverse, made up of species from seven distinct life zones. Relic Puya forests (*Puya raimondi*), queñua (*Polylepis* spp) and quisuar (*Buddleia coreacea*) are among its outstanding floral species.

Threats

Huascarán National Park is subjected to a series of threats and is in a **vulnerable** situation. The most significant threats include loss of vegetative coverage, livestock presence, tourism, mining, illegal hunting, hydroelectric projects, management limitations, and global warming that specifically threatens its glaciers. As a National Park, it is recognized as a category II World Conservation Union (IUCN) protected area and a category III World Heritage Site, categories that solidly support conservation objectives.



Mount Huascarán is located in the southern portion of the park and is the tallest peak

Description

Physical description

Huascarán National Park is situated in north-central Peru in the department of Ancash. It stretches 3,400 km² (340,000 hectares); its perimeter is 431,424 linear m. From its northern to southern border, it measures 158 km and on average is approximately 20 km wide. Ecologically, it is part of the Puna biogeographic province and includes almost the entire Cordillera Blanca Mountain Range. The park spans the provinces of Huaylas, Yungay, Carhuaz, Huaraz, Recuay, Bolognesi, Huari, Asunción, Mariscal Luzuriaga, and Pomabamba. There are 82 UTM-referenced markers along its border.¹

Huascarán National Park has three main objects. a) Conserve the park's outstanding biological diversity and natural value elements, including rare and endangered flora and fauna species such as the *Vicugna vicugna* (vicuña) and its principal habitat; population and area where *Tremarctos ornatus* (spectacled bear) and *Vultur gryphus* (Andean condor) have been most frequently reported (only parameter, due to lack of research); and remaining *Puya raimondi* (puya), *Polylepis* spp (queñua) and *Buddleia coreacea* (quisuar) forests. b) Protect landscape quality: maintain the park's pristine landscape character. The landscape is the park's main attraction, an expression of the superb quality of its ecosystems, and vital to the local economy. c) Protect water quality and quantity and provide stability to the hydrologic cycle. Water protection is one of the motivations for the park's creation and it is a major benefit for people living in Cordillera Blanca watersheds.²

Physiography

This rugged park is situated in Cordillera Blanca; it is flanked to the east by Callejón de Conchucos valley and to the west by Callejón de Huaylas valley. Features of this park, which is

unparalleled in its beauty, include snow-capped peaks of majestic heights reaching between 5,000 m and 6,768 m altitude (Mount Huascarán), deep ravines carved out by glacial fluvial erosion, and innumerable sparkling lagoons.

The landscape is a mix of intermediate and high altitude, severely eroded terraces that are steeply sloped (25 to 50%). One and two level terraces of fluvial-alluvial origin are present, mostly of sand-clayey material, as are lateral moraines as well as rocky peaks forging through many streams that loom over countless ravines and valleys.

Ravines on the western side of Cordillera Blanca's watershed divide are transversely oriented and extremely sloped, between 85 and 90%, although towards the southern end of the park slopes diminish and fluctuate between 30 to 60%. Ravines are typically between 200 to 400 m wide. Ravines on the eastern slope of Cordillera Blanca do not demonstrate the same traverse orientation as those on the western slope. They are closed and deep; ravine walls are sloped at 40 to 70%.³

Geology

Geological formations identified in Huascarán National Park date from the superior Jurassic to recent Quaternary periods and are made up of sedimentary, volcanic, and intrusive rocks and quaternary deposits that cover the Chicama, Chimú, Santa, Carhuaz, and Calipuy formations. Likewise, there are batholith quaternary deposits, structural characteristics, and folds and faults, such as the Cordillera Blanca regional fault.

The area's geologic structures are very complex; its Jurassic and Cretaceous formations are severely folded and faulted. A combination of Andean tectonics at the end of the Cretaceous Period, subsequent batholith positioning, and movements of the earth crust that affected the Andes caused these deformations.

Outcroppings of sedimentary rocks in the area are affected by various folds and are predominately oriented northwest to southeast, coinciding with the direction of the Andes Range. Faults cut through these folds.⁴

Soils

Huascarán National Park soils have been characterized according to land uses and ecological criteria. Soils formed from alluvial, colluvial-alluvial, glacial, residual materials, and anthropogenic forces. Based on cartographic units, soil consociation and association of large groups of soils are identified.⁵

There are soils apt for use as pasture, however climatic conditions limit their capacity. Other suitable land uses include protection; protection associated with pastures with agrologic quality in certain instances because of high erosion risk and steep slopes; forestry limited by climate and associated with areas suited for pasture; natural pastures of agrologic quality limited by erosion risk and steep slopes associated with protection-suited lands; protection-suited lands and lands appropriate for pasture with previously mentioned limitations associated with cultivatable lands

limited by soil and climate; forestry of agrológic quality under certain climatic conditions and associated with lands with low potential for pasture, seriously limited by erosion and slope.⁶

Soil erosion is active in the protected area, both because of natural forces (glacial retreat and climate change) and anthropogenic ones (overgrazing, deforestation, and agriculture in inappropriate zones, among others).⁷

Hydrology

The protected area's glaciers are a major part of its hydrology. In Huascarán National Park, glaciers are distributed along 180 km, from Mount Tuco in the south to close to Mount Champará in the north, with a series of imposing glacier-covered mountains. Approximately 27 glaciers are located above 6,000 m altitude and more than 200 are found around 5,000 m altitude. The majority of the rivers originating in the valleys drain towards the Santa River Basin.

Within the natural protected area, there are 663 glaciers measuring 693.72 km² with an estimated volume of 22,458 km³ (of potential hydrologic use, currently in solid state). Glaciers are not in any sense massive ice blocks immune from change or static in time and space. On the contrary, they are subjected to regional climate variations and global contamination and are constantly changing. Additional accumulations from precipitation (snow, ice, frost) during the wet season, and ablation, which is the surface removal of ice or snow from a glacier by melting, sublimation, and/or calving, both occur in tropical glaciers year-round and dominate throughout the glaciers' life.



Churup Lagoon

There are also a significant number of lagoons in the protected area. In fact, 296 lagoons have been identified, covering 28.14 km². The majority of these are glacial lagoons. Only 40 lagoons have been researched bathymetrically; total volume of water of those researched is 435,086,656 m³.

Waters from Huascarán National Park drain towards the Santa, Marañón, and Pativilca River Basins. The Santa River Basin includes 23 major rivers from Cordillera Blanca, which has 457 glaciers. Marañón River Basin includes 17 major rivers that originate from 192 glaciers. Pativilca River Basin receives the Piskaragra River that originates from 14 glaciers.⁸

Climate

Huascarán National Park is located within a tropical zone, and the highest snow-capped mountains in the world are found within the region. Precipitation in the zone originates primarily from very humid Amazonian air masses, although Pacific air movements have influence as well.

As air masses move over the mountains, they lose moisture during the ascent and eventually descend on the Pacific-side slopes. As a result, the Pacific-side climate is predominately cold and dry. The coastal desert's atmospheric stability influences the lack of moisture on the park's western slope. On the contrary, the huge air masses originating from Amazonian evaporation on the eastern slope contain a large amount of moisture that condenses and solidifies as the air ascends the mountains and falls as snow in Cordillera Blanca.

Minimum temperatures are found in the highest altitudes, and on average oscillate around 0° C. Maximum temperatures reach approximately 7° C. At lower altitudes, higher temperatures are found.⁹

Ecosystems

There are seven life zones in Huascarán National Park:

Montane Tropical Grasslands

This is a sub-humid and semi-cold climate ecosystem. Average annual precipitation varies between 250 mm to 500 mm and average annual temperatures fluctuate between 14°C and 6°C. It covers 1,700 hectares, or 0.5% of the park's area. It is located between 3,000 and 3,500 m altitude in the districts of Yuracmarca and Santa Cruz in the northern sector of the park.

Humid Montane Tropical Forest

This ecosystem is humid and semi-cold. Average total annual precipitation varies between 380 mm and 948 mm. Average annual temperatures fluctuate between 12°C and 6°C. These forests cover approximately 10,540 hectares, which is 3.1% of the park's area. Geographically, it is in the tropical latitudinal region and is distributed along Cordillera Blanca's western slope. In the park, it is found between 3,000 and 4,000 m altitude in the provinces of Recuay, Huaraz, Carhuaz, Yungay and Huaylas.

Very Humid Sub-Andean Tropical Paramo

This is a very humid and cold climate ecosystem. Average annual precipitation varies between 500 mm and 1,200 mm with average annual temperatures varying between 6°C and 3°C. There are usually daily freezing temperatures. This Paramo ecosystem covers approximately 69,020 hectares, which is 20.3% of total park area, within the tropical latitudinal region. It covers the provinces of Recuay, Huaraz, Carhuaz, Yungay, Huaylas, Pomabamba, Mariscal Luzuriaga and Asunción.

Pluvial Andean Tropical Tundra

This ecosystem has a very humid and frigid climate with average annual precipitation varying between 680 and 1,290 mm and average annual temperatures that vary between 3°C and 1.5°C. Freezing temperatures are present at night. Tundra covers approximately 110,500 hectares,

which is 32.5% of total park area. Geographically, it is in the tropical latitudinal region and is distributed along both slopes in Cordillera Blanca. Within the park, it covers the provinces of Recuay, Huaraz, Carhuaz, Yungay, Huaylas, Pomabamba, Asunción, Huari and Bolognesi, between 4,500 and 5,000 m altitude.

Very Humid Montane Tropical Forest

This ecosystem has a very humid and semi-cold climate. Average annual precipitation varies between 1,000 and 2,000 mm and average annual temperatures oscillate between 12°C and 6°C. It covers approximately 2,720 hectares, which is only about 0.8% of total park area. Geographically, it is also located in the tropical latitudinal region and is found on the eastern slope of Cordillera Blanca. Within the park, it covers the provinces of Mariscal Luzuriaga, Yungay Asunción and Huari, between 3,000 and 3,800 m altitude.

Pluvial Sub-Andean Tropical Paramo

This ecosystem has a super-humid and cold climate. Its average annual precipitation varies between 1,000 and 2,000 mm and annual average temperatures oscillate between 6°C and 3°C. It covers approximately 48,620 hectares, corresponding to 14.3% of total park area. As with the other habitats, it is within the tropical latitudinal region and is located in the southeastern sector of the park and covers the provinces of Asunción and Bolognesi, at about 3,800 m altitude.



Forest found in Llaca Ravine

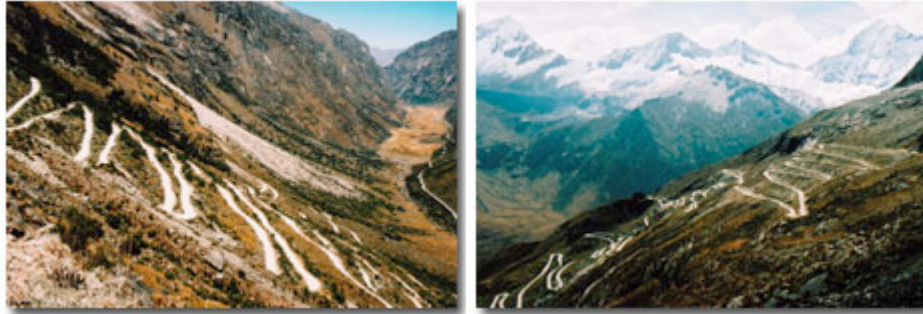
Tropical Snow-Covered Habitat

This ecosystem has a snowy climate with average annual precipitation between 500 and 1,000 mm. Average annual temperatures plummet below 1.5 °C. It covers approximately 96,900 hectares, corresponding to 28.5% total park area. Geographically, it is located in the highest peaks of Cordillera Blanca and includes almost the entire watershed divide within the park. It covers the provinces of Recuay, Huaraz, Carhuaz, Yungay, Huaylas, Pomabamba, Asunción, Huari and Bolognesi. It is found above 5,000 m altitude, obviously the highest sectors of Cordillera Blanca.¹⁰

Access

From Lima, one must take the Lima-Pativilca Highway (173 km), then follow the Pativilca-Laguna Conococha-Huaraz Route for 212 km and finally continue on the Huaraz-Caraz Section (68.6 km). From Lima, the entire route is on paved roads and is 453.6 km long.

From the coastal zone of Ancash Department, Callejón de Huaylas are accessed following these routes: Santa - Cañón del Pato – Caraz - Callejón de Huaylas. Chimbote – Nepeña – Pamparomás – Caraz – Callejón de Huaylas. Casma – Pariacoto – Huaraz - Callejón de Huaylas. Huarney – Aija – Recuay - Callejón de Huaylas.



Road in Ulta Valley, and Road in Llanganuco Valley

Then, from Callejón de Huaylas, one must ascend along five roads to the Conchucos Zone. The first route is Conococha-Mine Antamina-San Marcos (paved until Antamina) that borders the southern part of the park. The second route is Cátac-Chavín, the third is Pachacoto-Nevado Pastoruri, both through the southern part of the park. The fourth route is Carhuaz-Chacas, and the fifth is Yungay - Yanama, which travel the northern part of the park and are permanent roads. There are also secondary access routes, like Caraz to Mount Huandoy, and an infinite number of trails used by locals to hike in.

A challenge to the park's management is actually the number of routes accessible by car and the numerous bridal paths that transverse the protected area's 41 sub-basins.

Biodiversity

Flora

According to Holdridge Life Zones, most of Cordillera Blanca corresponds to Very Humid Sub-Alpine Paramo, Pluvial Alpine Tundra, and snow-covered Tundra, while Moist Montane Forests cover most valleys and ravines.¹¹

There are patches of *Puya Raimondi* (*Puya raimondi*) in the park, found mostly in Carpa and Queshque valleys. There are also relic quisuar (*Buddleia coreacea*) and queñua (*Polylepis sp*) forests. Riparian forests are located primarily along the northern sector of Llanganuco. There are high Andean grasslands and Puna grasslands. Oconales or bofedales (wetlands) are located about 4,500 m altitude.¹²

The area's seven life zones harbor a wide spectrum of microclimates, which create a mosaic of diverse, yet intimately related, vegetation types. 779 high Andean floral species belonging to 340 genera and 104 families have been identified in the park. Among this amazing floristic diversity, the Bromeliaceae family is represented by the *Puya Raimondi*, which has the largest

inflorescence in the world. There are also relic forests and numerous gramineae (grass) species that make up the Puna grasslands.¹³



Polylepis relic forest in Llaca Sector and Puya Raimondi in Pastoruri Sector

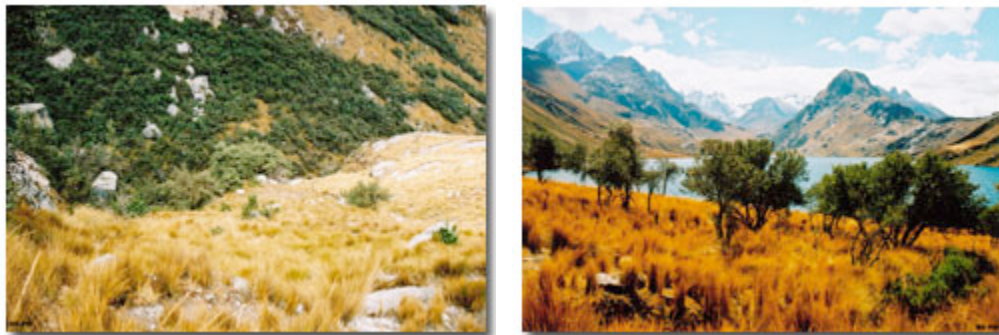
Eleven vegetation types have been identified in Huascarán National Park:

Forest

Highest floral diversity is found in the lower altitudes, in the valleys of Llanganuco and Parón (Riparian forest), where species include *Alnus acuminata*, *Weinmannia* sp., and *Polylepis sericia*. The understory abounds with a diversity of shrubs, ferns, and herbaceous species. In less protected, somewhat drier valleys, forests of *Polylepis weberbauerii*, *Gynoxys* sp., *Buddleia incana*, and *Tristerix* sp. grow.

Matorrales Shrubland

The matorrales are found in protected zones. Its shrubs grow in a very dense manner and grow rather tall. The most common species include *Gynoxys* sp., *Myrica pubescens* and *Baccharis* sp. The majority of matorrales grow in well-drained sites, like in valley bottoms and at the foot of slopes. Principal shrubs include *Lupinus* sp., *Baccharis obtusifolia*, *Berberis lutea*, *Diplostephium azureum*, and *Brachyotum* sp. High matorrales are frequently found in rocky puna sites. Here, the most common species include *Loricaria ferruginea*, *Buddleia coreacea*, and *Ribes* sp.



Relic vegetation and high Andean grasslands in the Churup and Querococha sectors

Granite Cliff Outcroppings

There are innumerable granite walls or cliffs, especially in the Llanganuco and Parón valleys, covered by lithophytic plants, including *Elaphoglossum* sp. and *Grammitis* sp. These plants have evolved to resist extreme temperatures and drought.

Rocky slopes

Landslides have formed rocky slopes with thin soils. These habitats are suited for lithophytic plants, like Orchidaceae, of the genera *Masdevalia*, *Stelis*, *Epidendron*, *Pleurothallis*, *Trichocerus muralis*. Bromeliaceae, such as *Tillandsia* and *Pitcairnia*, ferns and *Villadia imbricata*.

Pastures

Pasture or grasslands are the most extensive vegetation type in the park. They extend from the lowest altitudes to the biological limit where plants can grow (called the “tree line”). On the park’s western slope, commonly found species include *Embotrium grandiflorum*, *Calamagrostis festuca*, *Stipa ichu*, *Bromus calceolaria*, *Trifolium amabile*, *Astragalus garbancillo*, *Astragalus uniflorus*, *Castilleja* sp., *Lupinus microphyllus*, *Gentianella thyrsoides*, *Chiquiraga spinosa*, *Senecio spinosus*, *Muchlebekia volcánica*, *Alchemilla pinnata*, and *Opuntia floccosa*. In the Pachacoto River Basin and Queshque Valley, patches of *Puya raimondii* are also common.

Swamps

Swamps are found where soils are inundated. Representative vegetation includes *Carex* sp., *Juncus articus*, *Werneria nubigena*, *Plantago tubulosa*, *Lycopodium* sp., *Blechum loxense* and *Jamesonia* sp.

Tuberas

This vegetation type appears much like a swamp, but its dominant plants tend to form large and extensive mats. Characteristic species include *Oreobolus obtusangulatus*, *Distihica muscoides*, *Calamagrostis chrysantha*, *Senecio* sp., and *Castilleja* sp.



High Andean wetlands in Pastoruri Sector and Aquatic vegetation in Churup

Lakes

Diverse aquatic vegetation inhabits low altitude lakes, including submerged plants like Isoetes, emergent plants like Totora and floating plants like Azolla.

Pools

Pools of various sizes and with diverse vegetation are commonly found throughout the grasslands. Permanent pools have more complex vegetation than temporary pools, which only have one or two species of Isoetes. Representative species include *Isoetes* sp., *Ranunculus limoselloides*, *Alopecurus sequalis*, *Lilaea subulata*, and *Potamogeton* sp.

Springs

These sources or “eyes” of cold, crystalline water are characterized by particular flora, like *Mimulus glabratus*, and *Epilubium denticulatum*. There are also mineral springs, but no vegetation survives the high mineral content waters.

High Andean Vegetation

This vegetation type is made up of plants that have evolved and adapted to the rigorous high altitude Andean conditions; they are found above 4,500 m. These extreme conditions include tremendous variations between daytime and nighttime temperatures, low atmospheric pressure, frequent frosts, intense solar radiation, drought, frozen soils, and a daily freezing/melting cycle of ice on the soil. Their adaptations include structural modifications, such as dwarfism, matting, and deep roots. Representative species are *Senecio canescens*, *Werneria dactylophylla*, *Anthochloa villosissimus*, *Dielsiochloa floribunda*, *Calamagrostis* sp., *Festuca* sp., *Azorella pulvinata*, *Pyonophyllum molle*, *Nototriche* sp., and *Stangea henricii*.¹⁴

Fauna

Associated with the park’s vast floral diversity are numerous fauna species, many of which have yet to be studied or registered. The few existing studies have inventoried 112 bird species belonging to 33 families. Notable bird species include Andean condor (*Vultur gryphus*), torrent duke (*Merganetta armata*) and Puna tinamou (*Tinamotis pentlandii*).¹⁵ More than ten mammal species belonging to eight genera have been registered. The most notable mammals include pampas cat (*Oncifelis colocolo*) and Andean cat (*Orailurus jacobita*), spectacled bear (*Tremarctos ornatus*), Peruvian guemal or Andean deer (*Hippocamelus antisensis*) a ruminant whose antlers are bigger than the whitetail deer, and vicuña (*Vicugna vicugna*). Other important species include whitetail deer (*Odocoileus virginianus*), Incan cougar (*Puma concolor incarum*), culpeo (*Pseudalopex culpaeus*), northern viscacha (*Lagidium peruanum*), long-tailed weasel (*Mustela frenata agilis*), and hog-nosed skunks (*Conepatus* sp.), among others.



Wild ducks in Llanganuco Sector

Avifauna appears relatively healthy in most ravines and valleys. However, their absence in some evaluated ravines indicates that part of the structure on which they rely, especially forests and matorrales, is absent. More complex ravines, with greater habitat variety, harbor greater avian diversity regarding the total number of species. A longer evaluation would probably encounter more species per ravine, but it is unlikely that the number of typical forest species would increase much.¹⁶

There are 112 bird species belonging to 33 families, including Puna ibis (*Plegadis ridgwayi*), speckled teal (*Anas flavirostris*), ornate tinamou (*Nothoprocta ornata*), Andean flicker (*Colaptes rupicola*), American kestrel (*Falco sparverius*), Andean goose (*Chloephaga melanoptera*), black-crowned night-heron (*Ncticorax ncticorax*), and giant Peruvian hummingbird (*Patagonia gigas peruviana*).¹⁷ The park harbors a great variety of duck species including yellow-billed pintail (*Anas georgica spinicauda*), and crested duck (*Lophonetta specularioides alticola*). Other bird species include white-tufted grebe (*Rollandia rolland morrisoni*), giant coot (*Fulica gigantea*), Andean gull (*Larus serranus*), Puna hawk (*Buteo poecilochrous*), white-winged dove (*Zenaida asiatica meloda*), croaking ground-dove (*Columbina cruziana*), black metaltail (*Metallura phoebe*), Chiguanco thrush (*Turdus chiguanco*), rufous-collared sparrow (*Zonotrichia capensis peruviansis*) and white-throated caracara (*Phalcoboenus albogularis*), which is a very rare species in Peru, nationally protected and its capture or hunting is banned.¹⁸

The park harbors important populations of threatened species, such as the spectacled bear that is most often registered in the sectors of Llanganuco and Potaca. There are dispersed populations of Andean deer in the north. Andean condors are found throughout the park wherever cliffs that offer appropriate habitat for breeding exist. Another threatened species inhabiting the park is the vicuña. Populations can be found in Sector Carpa (original vicuña of the area) and in Llanganuco Ravine, although these groups originated from the province of Huancavelica.¹⁹

Management

Background

In 1960, a senator from Ancash, Mr. Augusto Guzmán Robles, was the first to suggest protecting the area when he presented a law to congress proposing Huascarán National Park. In 1963, the Forest and Hunting Service presented a different project delineating a 321,000-hectare park called Cordillera Blanca National Park. On February 18, 1966 Ministerial Resolution 101 was issued prohibiting logging and hunting of native species throughout Cordillera Blanca. On

October 27, 1966 the Huascarán National Park Trust in Yungay was formed. Then, in 1967, two Peace Corps Volunteers from the United States, Curry Slaymaker and Joel Albrecht, formed a proposal to protect 85,000 hectares. Simultaneously, Huaraz's Forestry Region established a vicuña and *Puya raimondi* monitoring zone spanning approximately 10,000 hectares.²⁰

On July 1, 1975 Supreme Decree 0622-75-AG officially created Huascarán National Park with a territorial extension of 340,000 hectares. Less than two years later, on March 1, 1977, UNESCO catapulted the park to international status when it recognized Huascarán National Park as a Biosphere Reserve. Biosphere reserves comprise multi-use areas that ensure conservation of ecosystems and their biodiversity. In addition, research of ecosystems under the influence of anthropogenic change is conducted, as is monitoring, and training of specialists.

The general concept of a biosphere was developed in 1974. Biosphere reserves are terrestrial and coastal/marine ecosystems, internationally recognized under the Man and the Biosphere Program. Three primary, complimentary functions are assigned to such reserves: a conservation function to protect genetic resources, species, ecosystems, and landscapes; a development function to promote sustainable human development; and a logistic function to support and encourage research activities, education, and permanent monitoring related with local, national and international conservation and sustainable development activities.²¹ Huascarán Biosphere Reserve's borders extend beyond the park and its buffer zone to incorporate the left bank of Santa River and the right side of Callejón de Conchucos, which includes several towns and rural settlements.



Vista Laguna Churup

In December 1985, Huascarán National Park was listed as a UNESCO Natural World Heritage Site. Sites on this list are of exceptional interest because they conserve globally important natural elements and are threatened to some degree. Peru's Government has committed to caring for the area because of its natural and global value. Protecting this heritage site is also of concern to the international community

Since Huascarán National Park was created, sector authorities have promulgated a range of regulations that together form the legal framework for protecting and restricting access. In addition, park staff has been working for many years to establish objectives, and then organize themselves to inform diverse groups about the objectives of the park.²²

When Huascarán National Park was established, the Forestry and Wildlife Law 21147 in effect applied to and regulated protected areas. It defined national parks as areas where flora and wildlife communities and landscape beauty would be protected.²³

As detailed in Supreme Decree 0622-75-AG of July 1, 1975 that created the park, the need to protect the area arose from the studies in Cordillera Blanca conducted by the General Forestry and Fauna Agency and Huaraz Zone III Agrarian Agency. These studies determined that because Cordillera Blanca was the largest tropical mountain range in the world and possessed rich flora,

fauna, geologic formations, snow-capped mountains, and exceptional landscape beauty that it, or at least part of it, should be conserved. Its diverse ecosystems should be conserved because of their great natural, scientific, and cultural value. Archeological monuments found in Cordillera Blanca attest to their importance in Peru's magnificent history. And, by establishing a national park, tourism activities could be developed that would directly benefit local people.

The park's creation decree also states that communal businesses and rural communities holding legal possession of lands within the park at the time of the park's creation could continue to conduct their traditional agricultural and grazing activities as long as they did not destroy the natural landscape, clear cut trees or shrubs, burn pastures, overgraze, or hunt or capture wildlife.

Chief Resolution No. 317-2001-INRENA established the park's buffer zone. According to the Natural Protected Areas Law, buffer zones are zones next to protected areas that because of their nature or location require special treatment to guarantee the protected area's conservation. The Master Plan of each protected area defines their corresponding buffer zones. Activities in the buffer zone should in no way threaten the protected area or compromise its ability to achieve its conservation goals.²⁴

Master Plan

The General Forestry and Wildlife Office of the Ministry of Agriculture issued Director Resolution 087-90-AG/DGFF approving Huascarán's first Master Plan on July 26, 1990. A Master Plan is a protected area's most important management planning document. These documents should be elaborated in a participatory manner and revised every five years. At minimum, the master plan defines zoning, strategies, and general policies for the protected area's management. Also included are organization, objectives, and specific management plans and programs. Master plans should also include a section on cooperation, coordination, and participation. There should be an action plan for implementing the plan and specific plans for different activities and resources, reflecting each natural protected area's particularities. Finally, each plan should also outline specific sub-plans for uses, fundamental lines of work, and major influences in the area.²⁵

Under the first management plan (effective from 1990 to 2001), Huascarán's management was focused on reaching three large objectives outlined in its creation degree: Conserving biological diversity, research, and contributing to development of surrounding communities.

In accordance with legislation at the time, Huascarán's 1990 Master Plan established five management zones:



Restricted Zone: An area with minimal human intervention, made up of characteristic ecosystems where moderate use for scientific reasons was permitted. Use of motors or vehicles in this zone was prohibited.

Primitive Zone: An area with significant landscape value where only activities in an unaltered environment were permitted. Any activity that would alter the environment was strictly prohibited.

Recovery Zone: An area whose natural environment had been severely altered or degraded, to the point that planning and implementing restoration actions were needed. Once restored, this zone would be rezoned to one of the other zoning categories.

Recreation Zone: A natural area that contains outstanding landscapes and resources appropriate for developing relatively intense recreational activities. Road and other visitor-support infrastructure were permitted as long as the area's environment was maintained in its natural state (to the extent possible).

Service Zone: A small area where infrastructure for administration or interpretation centers were permitted.²⁶

The public use program outlined in the 1990 Master Plan stated that projects and activities should be developed under four sub-programs: (a) Environmental Education, (b) Interpretation, (c) Ecotourism and Recreation, (d) Public Relations and Community Eco-development [Sustainable development].

Each sub-program has specific objectives with corresponding indicators and baselines that are incorporated in the revised and updated Master Plan, effective from 2003 to 2007.

The park's buffer zone extends approximately 170,000 hectares. Using existing data from 1977 when it was recognized as a UNESCO Biosphere Reserve, the 1990 Master Plan established its limits and recently, INRENA has made the description official (in Chief Resolution 317-2001-INRENA on December 13, 2001).

Zoning

Zoning is defined as a planning tool that facilitates compliance with natural protected area objectives and specific requirements of a natural protected area's category. To be an effective planning and management tool, zoning should in effect help a protected area reach its conservation goals and uses permissible by law within said protected area. Zoning also helps define strategies for managing distinct threats attacking a protected area and above all, helps determine use regulations for each type of zone. Huascarán National Park's current Master Zone defines the following management zones:

Strict Protection Zone

Areas zoned as “strict protection” are spaces where the ecosystems have been greatly or completely undisturbed, or include unique, rare, or fragile species or ecosystems that must be protected from outside influences and require original environmental quality and characteristics for survival. The only activities allowed in these zones are management and environmental monitoring, and under certain circumstances, scientific research.

The objective of the strict protection zone is to guarantee that Huascarán's key species, special communities and ecosystems can continue to develop and thrive completely free from human influence. Within the park, spectacled bear and vicuña habitats are considered strict protection zones, as are relic forests and puya meadows.

No buildings or service infrastructure is permitted in this zone and pasturing, tourism and recreation are prohibited. The administration promotes research oriented at monitoring native populations or critical ecosystems. No infrastructure—neither administrative nor control-related—is permitted. Certain monitoring equipment, such as meteorological stations, or monitoring plots could be installed with proper justification under a long-term research program. Park personnel or third-party scientists are permitted to conduct such research under specific agreements.

Wildlife Zone

The Wildlife Zone includes areas that have suffered little to no human intervention and maintain their predominant wild character but are less vulnerable than areas included in the strict protection zone. Administrative and control activities are permitted as is research, education, and recreation. However, no permanent infrastructure may be built and motorized vehicles are prohibited.

The wildlife zone's objective is to guarantee that certain key species, and special communities and ecosystems can develop with minimal human influence. To allow the ecosystems and their components to develop, only low or no-impact activities are permitted (regulated tourism and research). Grazing is prohibited. Special management actions are coordinated with the National Cultural Institute to protect archeological sites located in the zone.

Tourism and Recreation Use Zone

The tourism and recreation use zone includes areas with attractive landscape features that, because of their nature, are appropriate for recreation and are compatible with the area’s objectives. Educational and research activities are permitted and infrastructure for services (lodging, visitor enjoyment), access (roads), and motorized vehicles are allowed.

The objective of the tourism and recreation use zone is to assure that visitors to Huascarán National Park are satisfied, that they are educated, and awareness about the park is raised, thereby guaranteeing conservation of visited sites and resources.



Restoration Zone

This zone is a transitory zone and includes areas that have suffered major damage (either by natural or human-caused forces) and require special management to restore their quality and environmental stability to later rezone them according to their natural characteristics.

The restoration zone’s fundamental objective is to reverse deteriorating processes on affected ecosystems by implementing actions that will return its original characteristics. Other than actions needed to facilitate the restoration, no activities or uses are permitted in this zone.

Special Use Zone

The special use zone includes inholdings, or areas occupied by humans prior to the park’s declaration. It also includes areas where agricultural, livestock, agrosilvopastoral or other uses have transformed the original ecosystem.

The objective of the special use zone is to guarantee that traditional uses recognized by the park’s administration are conducted in areas with capacity to support such activities in harmony with the interest and general objectives of the protected area.

In accordance with current legislation, mining exploration/exploitation is permitted in protected areas classified with “indirect use” categories and only when adequate mining rights have been secured before the natural protected area was established. When mining occurs within protected areas included in Peru’s National System of Natural Protected Areas (SINANPE), INRENA then becomes responsible for controlling, monitoring, and sampling any mineral exploitation conducted. All current mining concessions must be zoned as special use zone until they end. Active mines are differentiated from abandoned or “passive” mines; the latter are included in restoration zones.

In addition, tourist lodges built within Huascarán National Park will remain in the special use zone until they comply with the Tourism and Recreation Use Plan and its use regulations and INRENA decides to rezone them to another zoning category. Being part of the special use zone

does not imply any operation restrictions other than actions required to come into compliance with the Tourism and Recreation Use Plan.

Absolutely no camps may be set up in areas declared as “landing fields for aerial rescues and/or emergencies.” These sites are established in coordination with the Alpine Rescue Unit of the National Police and are adequately marked. It is up to the park’s administration to ensure compliance within the special use zone.

All homes and family settlements within the park are considered part of the special use zone. In addition, a proposal exists to include 6 meters on each side of the 4 principal highways through the park as part of the special use zone. Any existing roads should be included on park maps and would be considered special use zones regardless of the zoning assigned to surrounding areas outside the 6 m buffer on each side.

Every inhabitant with use rights within the protected area should be censused and adequately informed of the characteristics, obligations and use limits of the occupied area. Traditional uses are limited to organic agriculture with native species and livestock. This type of agriculture is only possible for families settled within the park on their recognized landholdings, with an upper altitude limit of 4,000 m. Raising livestock is permitted for this demographic group below 4,400 m.

The Master Plan tries to improve natural resource management in all zones, making it compatible with the protected area’s category [National Park] and objectives and is the reason the park’s territory has been zoned as it has. The location of special use zones, and the others, will be updated as evaluations of the Plan’s implementation produce results that justify changes.²⁷

Management Programs

The director of Huascarán National Park confirms that the Master Plan (effective 2003-2007) determines park activities. During our interview, he said:

Management programs and operative plans have been designed. For example, there are reforestation efforts to restore degraded areas using native species, especially *polylepis*. There is control of tourism activities, not only controlling the visitors but their impacts. Another program is biological diversity monitoring, in which we gather biological information on vegetation, floristic communities, and others. Using UNESCO’s methodology, we learn about climate change and changes in floral communities. In collaboration with locals, we round up livestock. There are 62 use committees in the park, all of which were here using pasturelands before the park was declared. Another program is physical-legal territorial ordering, which also includes installing border markers. Another program is control and vigilance, in which we conduct rapid response patrols and ensure that no incident or infraction occurs. There is a program for increasing signage in the area, and there are plans to install of all types of signs, including directional and zoning signs, just to name a few.

The Plan also addresses infrastructure, investments in the park, control posts, maintenance, and vehicle and equipment purchases among others. The park's communication activities include the communication department and their activities to publicize information about the park so that people understand what it is. They are also responsible for facing political debates about the park and addressing any complaints. Another important activity is environmental education, within the public program; it is transversal because there is environmental education for pasture users, conservation committees, loggers, miners, general population, local governments, and many more. There are also activities related to integrating park planning with regional planning processes, and there is coordination with the regional government. We advise them on natural resource information, watershed management, economic management, and also about volunteer park guard activities.²⁸



Control posts at Llanganuco and Carpa

Resource Conservation Program

General considerations, criteria, and program outline

Even though category of national park only permits indirect uses, during the process to establish Huascarán National Park, direct resource use was recognized as an exception and granted to subsistence farmers traditionally inhabiting the area. The exception was legalized in the park's creation decree and in Ministerial Resolution 01200-80-AA/DGFF, which created and defined Pasture Users Committees. This condition represented a very special management challenge for the park because it had to both maintain the central objectives of its management category [National Park], while also integrating the rural population's demands for development, trying to incorporate the park into a context without structure or planning.

Resource Management Sub-program

The objectives are: Guarantee conservation of grasslands and forests and associated species through testing and consolidating participatory management models.

Incorporate local knowledge and cultural values into the strategies and methodologies to protect conservation targets. Reduce impacts on rivers, lagoons, and other sources of water produced by mining activities and securely manage lagoons for electrical energy development. Guarantee conservation of the park's landscape quality.

Protection Sub-program

Objective: Consolidate the park's borders, reduce infractions, and discourage potential lawbreakers.

Public Use Program

General considerations, criteria, and program outline

Public use is the second principal objective of all natural protected areas in general and Huascarán National Park specifically. Protected areas offer an opportunity for the public to enjoy an encounter with nature that will enrich them spiritually and increase their knowledge of the natural world. The Education and Tourism Use sub-programs should provide these opportunities and transform the uses into conservation tools by creating constituencies that support Huascarán National Park.

Tourism and Recreation Use Sub-program

Objectives are: Reduce the main impacts of tourism to the extent possible and develop a tourism impact prevention system (prevent garbage accumulation, excess visitors, water contamination, and landscape degradation). Facilitate and direct organized participation among local communities and the private sector to provide tourism services in Huascarán National Park, thereby generating sustainable economic alternatives for local people.

Education Sub-program

Objectives are: Strengthen the park's management with proactive support from different user groups who are dedicated to the park and can help protect its natural resources. Strengthen the park's management with a strong constituency base that is convinced and understands its conservation value and are committed to its proper management.

Management Support Program

General considerations and program outline

The Management Support Program is conceived as the support needed for other management programs. Of course, the Natural Protected Areas Agency (INRENA) is an essential component to this program because of its continued presence and decision-making and management role, as

guided by the Master Plan and park directors. They guarantee that their actions are consistent with INRENA's general directorates related to park management.

Cooperation Sub-program

Objectives are: Strengthen the management committee to increase their power to support the natural protected area. Integrate Huascarán National Park and its buffer zone. Participatory management of its buffer zone will contribute to conserving biodiversity within the protected area, reduce impacts generated in nearby areas, and offer users real options to manage renewable resources. Convert the buffer zone into a space where interinstitutional coordination is exemplary and where innovative developments would help improve local people's capacity to manage local natural resources and improve their quality of life.



Promote participation among related stakeholders in the buffer zone in its environmental land use planning, focusing on water as the primary resource. Generate a diversity of benefits from biodiversity functions in the buffer zone and distribute benefits to a wide range of directly involved stakeholders. Integrate Huascarán National Park actions in regional development activities and create the foundation necessary to truly implement Huascarán Biosphere Reserve.

Information Sub-program

Objectives are: Ensure that park administrators have reliable, relevant and opportune information to guide management programs, especially to protect conservation targets in the park. Develop a monitoring system in which conservation progress of conservation targets could be measured and efficiency of different adopted management measures evaluated. Create a support unit that compiles all existing information on Huascarán National Park and Huascarán Biosphere Reserve that would facilitate communication about the park to locals and the international community and that would help administrators and INRENA make appropriate decisions.

Administrative Sub-program

Objectives are: Strengthen park administration towards its consolidation as an evolving managerial team. Achieve an infrastructure, vehicle, and equipment maintenance system that will allow staff to carry out its park-related functions and activities. Ensure that management programs have a flow of adequate financial resources.

Financial Sustainability Sub-program

Objective is: Achieve financial sustainability by implementing mechanisms that will allow the park to take advantage of regional, national, and international funding opportunities to permanently finance Huascarán National Park and its management programs.²⁹

Huascarán Work Group

In 1998, the Antamina Mining Company proposed using one of Huascarán's internal routes as its only access route to its center of operations. This generated strong, widespread opposition from many diverse sectors. After negotiating and consulting, the Antamina Mining Company understood the implications of using this route and analyzed other options. The company decided to build a new access road outside of the national park's boundaries. It is within this context that Huascarán Work Group, a multisectoral assemblage made up of governmental agency representatives as well as non-governmental organization members, was born. The Work Group watches out for the interests and conservation of the national park and biosphere reserve.

Huascarán Work Group is a foundation on which communication and cooperation channels are built and actions coordinated to move towards a common sustainable development vision. It offers an opportunity for public and private institutions to participate. Through proposal generation, stakeholder coordination, and coalition building, stakeholders contribute to Huascarán Biosphere Reserve's sustainability and integrated management. The group seeks to develop capacity, strengthen development processes, and guarantee the industrial sector's participation in sustainable development. It also works to help Huascarán National Park reach financial and institutional sustainability.

Principal members of Huascarán Work Group are: National Institute of Natural Resources (Instituto Nacional de Recursos Naturales, INRENA), Peru's Committee of the World Conservation Union (IUCN), the Mountain Institute, Pronaturaleza Foundation, Conservation International, CARE-Peru, Peruvian Society of Environmental Law, Regional Government of Ancash, Regional Executive Secretary for Ancash La Libertad del Consejo Nacional de Medio Ambiente (CONAM), Ancash Regional Office of Energy and Mines, Urpichallay Association, Association of the Municipalities of Callejón de Huaylas, Santiago Antunez de Mayolo National University, Antamina Mining Company, Barrick Misquichilca Mining Company, Mitsui Mining & Smelting Co., Pallca Project, Arequipa Mining Company, Toma la Mano Mining Company, Nueva California Mining Company, Ancash Technical Irrigation District, National Cultural Institute, Duke Energy, and Huascarán National Park Management Committee.

During an interview with the group's coordinator, he defined the group in this way, "Huascarán Work Group is a group that seeks to participate in the protected area's management, although the scope is much bigger since we focus our efforts on the entire Huascarán Biosphere Reserve. We try to help the biosphere reserve reach its objectives and help it function as a true biosphere reserve. The group identifies leading environmental problems and through the coalition and dialogue, our members try to discuss alternatives or provide involved, interested parties and stakeholders the chance to talk to one another about the problem and/or possible solutions with researchers and institutions in an effort to minimize impacts generated by activities conducted in the region."³⁰

Management Committee

Huascarán National Park has an active management committee. In general, management committees are made up of groups and people involved in protected area matters. Its function is to support a natural protected area according to what is established by law, the protected area system's strategic plan, regulations, and the particular area's master plan. These are not legally established organizations although they can be permanent committees, depending on whether or not it is renewed over time.³¹

Administration

Peru's natural protected areas are under the management of the Intendencia de Áreas Naturales Protegidas (Natural Protected Areas Agency), Instituto Nacional de Recursos Naturales (National Institute of Natural Resources - INRENA), which belongs to the Ministry of Agriculture. The Natural Protected Areas Law No. 26834, dated June 30, 1997, and its bylaws regulate the present administration.³²

There are a total of 13 park guards distributed in 8 control posts: one in Choquepalpa – Pastoruri, one in the eastern zone of Huarí province, another in Ultra Valley that goes towards Chacas, and older stations in Querococha, Yuncayhuanca, Llanganuco, Chinancocha and el Corral. There are six professional technicians that oversee activities and programs including a biologist, two environmental engineers, a geographer, one professor, a social communicator, and a forestry engineer who recently quit. There is one administrator and an administrative assistant and two drivers (one doubles as a watchman also).

In implementing the Master Plan, an administrative center was built and now runs out of the city of Huaraz. In addition, existing infrastructure at Llanganuco and Carpa park guard stations has been improved. Funding for these improvements came from an international aid project called PROFONANPE of the German Development Bank.

In an effort to use park resources sustainably, Pasture User Committees were formed. At the time of the park's creation, a large number of rural farmers had been using native grasslands in each of the protected area's valleys. Their user rights were recognized in Ministerial Resolution 1200-80-AA/DGFF. Huascarán National Park promoted and carried out the process to organize native pasture users into committees as it responded to the legal regulation and recognition of the park's social and historical context that demands participatory management.

In order to try to “compensate” for their use of native grasslands, Pasture User Committees are supposed to assume conservation responsibilities. They are obligated to grow tree nurseries stocked with native forestry species that will be used to restore deforested areas within and outside of the park. This organizational model also permits users to engage in control activities (rural farmer park guards) to prevent and control logging, illegal hunting, medicinal and ornamental plant extraction, fires, cattle rustling, and other infractions.³³



Huascarán National Park administration is organized in four sectors, defined by logistic facilities and access: Llanganuco sector, Carpa sector, Ichic Potrero sector and Potaca sector. The park's 340,000 hectares are divided into the sectors in the following way: Llanganuco sector (105,462.80 hectares), Carpa sector (97,071.75 hectares), Ichic Potrero sector (79,112.45 hectares) and Potaca sector (58,353.00 hectares).³⁴

Sub-basin Planning Strategies

The Natural Protected Areas Agency (INRENA) responsible for the park's management and administration has designed a planning strategy for each of the protected area's sub-basins. Under this strategy, user groups should internalize planning principles and fundamentals. The strategy states that there should be a guiding tool for planning, and accurate information about the potential and problems present in each sub-basin should be available. The strategy also seeks to achieve local participation so that the natural resources of each sub-basin are managed sustainably.

The starting point for the planning strategy is to define the local population's perceived needs and outline experiences of different institutions carrying out productive activities or providing services in each sub-basin and work sectors. The goal is to promote sustainable development of production and service activities that are compatible with stability and respect the environment.

Planning strategy documents for the sub-basins of Carhuascancha, Huaritambo, Llanganuco, Arma, and others have a reference framework, strategy principles and fundamentals, strategic role, a sub-basin diagnostic and problem identification.³⁵

Budget

From the Master Plan's approval in 1990 to 1998, attempts to channel funds for Huascarán National Park failed and the park had to rely only on resources from public coffers (INRENA and Ancash Regional Administration) and collected entrance fees. Recent aid from Germany changed this dismal situation and an operation and investment project good through 2006 was developed.

Administratively, financial management boils down to budgetary implementation that is approved by specialized INRENA offices within INRENA's national headquarters, and financial reporting of costs according to current regulations per source of funds (funds raised through fees, public coffers, and international aid). The Master Plan's projects and specific plans mandate how the money is managed and interinstitutional efforts to capture additional funds complement the budget.³⁶

According to the Master Plan, there are \$219,120 US Dollars allotted every year for personnel salaries (for 2005, 2006, and 2007). To have an idea of the magnitude of the amount of funds managed for Huascarán National Park, the table below lists the consolidated costs of

management programs and sub-programs, according to what is projected for the last three years of the current Master Plan.³⁷

<i>In \$ US Dollars</i>	2005	2006	2007
Operational Budget	\$476,894	\$572,693	\$710,949
Investment Budget	\$200,351	\$130,000	\$100,000
TOTAL	\$677,245	\$702,693	\$810,949

Human Influence

Background

Human presence in the area dates back thousands of years. Surrounding Cordillera Blanca are many archeological sites that represent millennia of cultural development, such as La Galgada, Tumshucaico (Caraz), Huaricoto (Marcará), Honko Pampa and Chavín de Huántar. For thousands of years, people crossed the mountain range using various valleys like Santa Cruz-Huaripampa, Llanganuco-Morococha, Ulta-Potaca, Honda-Juitush, Uquian-Ututo-Shongo, and Olleros-Chavín. There is evidence of great agricultural terraces and antique corrals on mountain slopes and in many valleys. Engineered dams and canal systems provided water to cultivated lands and pasture zones. There are numerous highland cave paintings depicting camelids, stone tombs and other tombs that demonstrate the close relationship between ancient people and the mountains and lagoons.³⁸ Thus far, 33 archeological sites dispersed throughout the park's various habitat types belonging to different cultures, primarily the Chavín culture and Inca, have been identified. Evidence includes cave paintings, platform systems, roads, stone tombs, tombs, and fortifications among others.

Throughout the colonial period and especially during the first years after Peru's independence, many large plantations were established in the region, and many communal lands were privately appropriated. During the 19th Century, indigenous people registered innumerable complaints and took action against plantation owners. Indigenous people would block and place watchmen at the entrances of many valleys of what is today the park, demanding access to the forests for firewood, pastures, and other natural resources. Eventually however, plantations were established on traditional communal lands and developed their own methods for using the natural resources. During the second half of the 19th Century, indigenous protests known as the "Atusparia Rebellion" accompanied the process to privatize the highlands of the area today protected by Huascarán National Park. These protests were associated with the fact that indigenous people were forced to pay taxes even though they had lost their communal lands' resources and were oppressed by authorities.

Starting in 1969, the agrarian reform entered lowland valley zones and highland zones were reserved as a State Protected Area—coincidentally, these highland zones corresponded to what were the traditional communal lands before and during colonial times, where pastures, forests, lagoons, and glaciers could be found.³⁹



Tambillos Community located within the protected area and herders houses

According to the 1990 Master Plan, there were approximately 74 families (about 350 people) settled within the park at that time, on Cordillera Blanca's western and eastern slopes. Today, the majority of these people live in extreme poverty. Their economy is stagnant and production and traditional use methods are considered rudimentary at best. Production is subsistence and deficient and keeps them in poverty. According to the 1990 Master Plan, park inhabitants live in 7 population centers: Llama Corral and Auquispuquio (25 families – 100 inhabitants), Yuraccorral and Llanganuco (2 families – 8 inhabitants), Juitush (1 family – 6 inhabitants), Rajucola (1 family – 6 inhabitants), Tambillos Ragra cancha (39 families – 195 inhabitants), Pacchacancha, Querococha and Conde Corral (7 families – 34 inhabitants), totaling 349 inhabitants.⁴⁰

Today there are an estimated 200 families with approximately 850 people inhabiting the park, although precise data does not exist. There are approximately 50 communities in the buffer zone. Thirty-two districts surround the park, which spans 10 provinces in the department of Ancash—basically covering half of the department. Certain communities, like Cátac for example, have about 2000 people, and Mico has 1000 inhabitants. In total, it is estimated that there are between 4000 and 6000 inhabitants living in the buffer zone.⁴¹

In and around Huascarán National Park a variety of direct use activities are developed. People engaged in such activities view the natural resources as an opportunity to make money. In the park's immediately surrounding areas, more than 260,000 people inhabit large towns like Caráz, Yungay, Carhuaz, Huaraz, Olleros, Recuay, Ticapampa, Catac, Chiquián, Chavín, Huari, and Pomabamba, among others. In addition, there are many small rural communities including Aquia, Fuerza y Poder, Recuay Huanca, Vicos, Canray Grande, Tupac Yupanqui, La República, Acopalca, Yacya, Cruz de Mayo, Santa Cruz, Pampacancha, Los Vencedores, San Jacinto de Mita, Atusparia, Tumpa, and Huascarán, among others.

Human presence generates difficulties. In an interview, the Director the Regional Office of the Environment and Natural Resources of Ancash's regional government (sector II) said, "What we have in the park are conflicts with the communities who have traditionally occupied these sectors for years. Remember that Huascarán National Park was created during the 1970s, after the Rural Communities Law was passed. This granted the land to them, it is their property, and the park's borders were superimposed on their properties. Luckily, there is coexistence thanks to established zoning."⁴²

Tourism

Historically the region has suffered from diverse catastrophes stemming from the fragility of Cordillera Blanca's relatively young geologic formations. The flood of 1936 destroyed part of Huaraz city. The earthquake of 1970 took more than 70,000 lives, destroyed countless buildings, affected railways and a hydroelectricity generator, and even swept away part of the Pan-American Highway. This historical disaster indirectly affected tourism and the park. International aid rebuilt and resurfaced the Huaraz-Lima Route and hundreds of international collaborators and aid workers flooded the area, creating in effect the first tourism boom in the mountainous region. As a result, small family businesses and spontaneous lodging facilities that formed at the time have gradually and partially formalized into what is today the area's tourism sector.⁴³

The Huascarán National Park Tourism and Recreation Use Plan was formulated in 1996 and was approved via Resolution 056-96-INRENA on March 15, 1996. This document outlines the policies and strategies for managing tourism within Huascarán National Park. Eight management programs aim to implement these policies and strategies.

Along the variety of tourism circuits, an assortment of signage has been posted, including camping signs, information signs, directions and position markers, signs to bathrooms and those corresponding to park guard stations.

The first year for which records on tourist numbers were kept was 1987, and that is considered to be the park's baseline data on tourism. In 1987, a total of 62,536 national and 6,000 international tourists passed through Llanganuco and Carpa control posts, which are the park's main entrances. Thirteen years later in 2000, there were 95,446 national visitors and 13,617 international visitors. That represents a 52.63% and 129.95% increase, respectively.⁴⁴



Tourist groups climbing Pastoruri and the concentration of transportation

Huascarán National Park Tourism and Recreational Use Plan defines three types of tourism within the park: conventional, trekking, and mountain climbing. There are 9 destinations with 20 variants for conventional tourism, 24 circuits for trekking, and 102 destinations for climbing.⁴⁵ In reality, conventional tourism is congested at Yungay within Llanganuco valley with destination favorites that include Chinancocha Lagoon, and the Maria Josefa and Chinancocha Trails, and at

Pachacoto-Pastoruri whose main attractions are various sources of gasified water, the Pumapashimin Lookout, cave paintings, and Pastoruri glacier.

According to studies conducted by the Regional Office of Industry, Tourism, and International Integration and Business within Ancash Regional Government, the park's contribution to the local economy is estimated on these assumptions: 1) National visitors can pay on average US\$35 per person per day and stay on average 3 days out of the year; 2) International visitors can pay on average US\$100 per person per day and stay 10 days out of the year. Overall, tourism's contribution to the local economy is significant.

Businesses related to Huascarán's tourism sector include:

- Travel and tourism agencies 53 (conventional tourism)
- Tourism transportation services 15 (conventional tourism)
- Tourist information agencies 2
- Official conventional tourist guides 155
- Hiking guides 50 (adventure tourism)
- Mountaineering guides 38 (adventure tourism)
- Practical guides 25 (adventure tourism)

Saint's Week, or Semana Santa, is the biggest travel week in Latin America. The following table summarizes visitation to Huascarán National Park during Semana Santa in 2005⁴⁶

DATE	NATIONAL		INTERNATIONAL		TOTAL
	Adults	Children	Adults	Children	
3/24/05	131	1174	92	0	1397
3/25/05	256	1545	73	9	1883
3/26/05	90	513	15	1	619
3/27/05	3	89	2	0	94
TOTAL	480	3321	182	10	3393

The following table summarizes visitation to Huascarán National Park during the first trimester in 2005⁴⁷

MONTH	NATIONAL				INTERATIONAL			TOTAL
	Adults	Children	School	Total	Adults	Children	Total	
Jan	1768	156	82	2006	899	12	911	2917
Feb	1390	151	0	1541	333	7	340	1881
March	6759	746	0	7505	685	18	703	8208
TOTAL				11,052			1,954	13,006

There are approximately 174 registered lodges, hotels, and hostels, 160 restaurants, and 20 interprovincial transportation agencies in Ancash's mountainous zone that offer tourist services and represent a significant source of income for the regional economy.⁴⁸

Because tourism has increased in the region, and projections predict future increases, several institutions have emerged that are dedicated to promoting and developing tourism. The Ancash Association is an NGO with support from Antamina Mining Company. It is developing a sustainable tourism promotion and training center called "Tambo Conchucos." Through tourism, it aims to generate employment and income for the province of Huari and surrounding areas, contribute to strengthening cultural identity, and conserve the area's natural and cultural heritage.

One member of the association talks enthusiastically about their objectives and projects in the region. He said, "We have been encouraging tourism development in Huari zone by promoting tourism that takes the national park's incredible features into account. There have been a variety of activities, like workshops and round-table discussions, to pass along information necessary to promote tourism and local discussion on the subject. One resulting project is a tourist corridor development project called "Oro de los Andes," meaning Gold of the Andes. This project includes almost the entire Antamina zone of influence and is run by Ricardo Palma University. Hotel Escuela in Chavín, located in the park's buffer zone, is an ecotourism pilot project in the zone. This hotel has dual-functionality. It is a working business and promotes sustainable development. The Ancash Association works to raise money and coordinates with several institutions to finance joint-tourism development projects near the park, like Huanter where Carhuascancha and Rurichinchay valleys are located. This particular activity in Huanter is coordinated with local institutions and the Huanter Municipality."⁴⁹

An Italian missionary NGO, the Mato Grosso Association, works with poor youth in the area and has a large presence in the community of Chacas, Asunción province, within Callejón de Conchucos. Their work covers education, health, and community development support. The association also has an Andean training school that prepares youth to become mountain excursion guides, cooks, pack haulers, and expedition organizers. They also have several basic lodges in a few places throughout Cordillera Blanca that provide hikers a place to rest, clean up, and eat. Their lodges or refuges are located in Pisco (2 hours from Llanganuco), Huascarán (4 hours from Musho), Ishinca (3 hours from Collón) and Longoni (5 hours from Collón). The use the money collected from lodging tourists to fund services for abandoned elderly people in the community.⁵⁰

Conservation and Research

Background

During the 1860s, Italian scientist Antonio Raimondi led the first detailed geologic study of the region and published a book called “Ancash and its mineral riches” (1873), and a map of Ancash. He also included details about the region’s floristic richness and mentioned some of the archeological remains found in Callejón de Huaylas and Conchucos.

On October 3, 1903 Reginald Enock, an engineer from England, began the conquest of Cordillera Blanca’s glaciers. He investigated a possible route over a glacier east of Huaraz, between the Cayesh and Carhuascancha streams. He attempted to climb Mount Huascarán in May 1904 but was short of the summit, reaching only 5,100 m. On September 2, 1908, American Annie Peck with two Swiss Guides, Gabriel Zumtaugwald and Rudolf Taugwalder, led the first successful expedition to Huascarán’s northern summit after two unsuccessful, frustrating attempts in 1904 and 1906.

At the end of the XIX Century and the beginning of XX Century, German researchers Gustav Steinmann (geologist), Augusto Weberbauer (botanist) and Wilhelm Sievers (geographer) conducted more thorough studies in Cordillera Blanca and published their results in books and articles. French scientist A.C. de Carmand expanded upon Raimondi’s observations about mineral deposits in the region. It wasn’t until much later, in 1984, that American botanist David Smith conducted the first detailed floral census in the mountain range. He registered 799 species within Huascarán National Park.

In 1932, Alpine Societies (Alpenverein) from Germany and Austria began scientific expeditions to Cordillera Blanca. They were the first to successfully summit Mount Huascarán after ascending the southern slope. Distinguished scientists, like Philipp Borchers, Hans Kinzl and Erwin Schneider, were part of the expeditions and they wrote «Die Weisse Kordillere» (1935), which is considered to be the first systematic study of Cordillera Blanca. The created new maps of the northern and southern sections and in 1950, cartographer Fritz Ebster made the first map of the entire range. Kinzl directed other expeditions in 1936, 1939 and 1954 to climb and study the range’s peaks, glaciers, and lagoons. In collaboration with Erwin Schneider, he published a marvelous, illustrated, trilingual book called, “Cordillera Blanca” (1950).⁵¹

Biological diversity and cultural research

According to the 1990 Master Plan, research on the natural resources should be applicable and oriented towards providing baseline data essential to decision-making in management programs and subprograms. The plan also stated that specialized institutions and professionals would conduct the research under the protected area’s authorization. According to the Plan, historic-cultural research was supposed to increase knowledge of already-identified culturally valuable sites and work to achieve preservation of the park’s cultural heritage.

The 1990 Master Plan established and identified a collection of research projects to be developed over the time and created a plan for collecting indicator and baseline data. Research conducted

during the plan's subsequent 11 years was concentrated in Yuraccorral, Chopicocha, María Josefa, Llanganuco Control Post, and Carpa Control Post. The following research was conducted:

1) Census of vicuña population dynamics. In 1990, the baseline data registered 350 vicuña. In 1994, they recorded 283 vicuña, which represents a 24.86% decline. 2) Medicinal plants. Five nurseries in Carpa and Llanganuco grew medicinal plants for research purposes. 3) Forestry. A queñua forestry management project was completed in 30 experimental plots. 4) Livestock. Recently, the protected area conducted studies on the grasslands' carrying capacity for livestock. Results are not yet finalized.⁵²

The Research Program of the 1990 Master Plan established eight objectives, summarized here: 1) Promote scientific research of representative ecosystems to preserve their genetic diversity and guarantee their rational use. 2) Find level of optimal equilibrium between use and preservation of the protected area's resources (carrying capacity) and promote transfer of knowledge about wildlife to encourage communal sustainable development in surrounding areas. 3) Promote research of watershed sub-basins for integral management and understand glacier behavior and response to dynamic and climatologic phenomenon. 4) Understand tourism's impact on the park. 5) Integrate research policies with regional, national, and international institutions.⁵³

A wide variety of outside researchers have conducted studies in the park; mostly, their studies reflect the researchers' interest and priorities rather than park needs. In fact, very few of the studies conducted in the region have provided final reports to the park.

Threats

Threats to Huascarán National Park include:

- Loss of vegetative coverage
- Livestock
- Tourism
- Mining
- Illegal hunting
- Hydro Power
- Management limitations
- Glacier reduction

By far, increased natural resource use and loss of vegetative coverage are the biggest threats affecting the largest area in Huascarán National Park. Inhabitants living nearby and even within the park are increasing their use of the park's natural resources and loss of vegetative coverage means that fewer areas can be classified as "primitive" or "pristine" and more and more areas have been changed and degraded. But why are locals increasingly relying on the park's natural resources? The answer is lack of economic alternatives. While tourism might be one alternative, it is currently disorganized and the park's administrative capacity for control is weak. In addition, several stakeholders involved in tourism require seriousness in order to address the issues necessary to increase tourism's environmental and economic sustainability. The mining

industry is another threat; they fail to follow environmental regulations in their small mining operations within the park and corresponding authorities do not provide proper oversight. Another threat is the introduction of non-native flora and fauna, especially cows, sheep, and donkeys, as well as eucalyptus and pines.

Loss of vegetative coverage

Wildfires that affect forests, native vegetation, and habitats typically begin when herders burn pastures but quickly lose control. Firewood collection is another source contributing to vegetative coverage loss, as is clearing to open up more lands for farming. Livestock within the protected area accelerates loss of vegetative coverage.

Burns greatly impact the park's vegetation and biodiversity. The mayor of Chacas comments that everyone burns their farm plots and because farmers are careless, the fires easily spread to native pastures because during the burn season, pastures are very dry and it only takes a small amount of wind to generate out of control wildfires. He said, "This damaging tradition continues and is a real problem today."⁵⁴



Burning in Potaca Sector, and burning of Puyas Raimondi in Pastoruri sector

Firewood collection and sales are widespread in the region. Firewood is for sale everywhere, especially eucalyptus—native species like queñau and quishuar are less prevalent, but their sale still exists. One firewood vendor, for example, confirmed that he sells these species. He said, "I don't cut firewood, I buy it for resale. I buy queñau, eucalyptus and even chapá leaves and ichu. I buy queñau branches for 20 cents each. I have to pay INRENA for my firewood permit; it is actually a permit to transport a small amount of firewood, only three hundred packs. There are people who bring truckloads and of queñau. It is worth it to pay for these people to pay the authorizations. They pay INRENA for the right to transport 300 units of queñau, about 15 to 22 soles depending on the total amount, to Lima. I buy from rural farmers, mostly those from the community of Macashca and from all around Huascarán. They bring me 20, 30, 50 and sometimes 100 packs. I do not buy trunks, only branches. I have never bought trunks, but there are a lot of collectors who cut trunks and make logs out of the whole tree, generating waste. Cutting only the braches, especially the dry ones, is like trimming the tree. But, people in the communities tell me that some collectors cut the trunk. That is what INRENA is controlling because there are a lot of people doing it. But, people get away with it—they run, hide, and conceal their collected firewood someplace obscure. I am close to INRENA so I cannot hide, I have to work legally."⁵⁵

Loss of vegetative coverage is increasing because more people within and around the park are increasing their use of the land. In addition, their activities cause soil compaction and erosion that hinders regeneration and damages and degrades habitat. As a result, there are fewer areas zoned as primitive within the park and more intervened areas. Social conflicts result in certain areas because of use. Not only that, water and soil becomes contaminated because of increased activity.

The Master Plan identifies 74 places where pastures are frequently burned, 58 locations where forests are indiscriminately logged, 53 places where lands have been opened up for farming activities, 10 places with vegetative coverage loss, and 19 locations with a human settlement of 5 or more families.⁵⁶ The most frequently burned areas are in Ulta and Parón Valleys. In Ulta, pastures in the valley and the upper parts are burned and these burns impede polylepis forest regeneration and extension.⁵⁷



Locals within the park rely on firewood for fuel and use donkeys to haul firewood for sale

Livestock

The socioeconomic sector involved in raising and managing cattle and sheep within the park is extremely poor, marginalized, and lack access to the advantages of modern life. Their marginalization has deteriorated their quality of life dramatically, influencing their livestock production in everyway. Add to this inadequate transfer of technology and insufficient technical assistance, which have caused livestock production to fall to subsistence levels at best.



Cattle grazing in Ulta Valley

As one might expect under these circumstances, the small livestock raisers and rural communities are unable to earn sufficient capital and they lack technical experience. Then, natural resources are lost and deteriorated (water, soils, and high Andean prairies), and the quality of their herds decreases. Without adequate management techniques and animal sanitation, livestock products are low quality—without economic possibilities the producers cannot afford costs

associated with sanitary measures and disease prevention. Without proper sanitary measures, the animals do not improve, especially because different parasites like *Fasciola hepática* and *Taenia saginaria* attack and weaken the herds.

Overgrazing and lack of knowledge about how to raise cattle in stables threatens natural pastures, soil quality, and promotes progressive loss of vegetative mats that help retain water.

Commercialization services are deficient. The producers completely lack any skills to negotiate with buyers. Demand for meat in urban markets is very low because of consumption patterns. Demand in rural sectors exists, but price paid is very low since most rural people are poor.

One root cause of poor technical assistance and process operation is weak civil society associations—they do not participate in production processes, do not have presence in political circles and therefore have no influence in decisions. Over time, traditional collaborative associations are weakening. Rural communities are weak and lack capacity to raise capital.

Alpaca producers do not fair much better than those raising cattle. They do not have access to the market and they lack solid, strong associations needed to confront low prices for their products. In addition, mostly primary materials are sold, very few materials are transformed into aggregate products that could reap a better price. The market is informal with a lot of intermediaries, who capture the most returns. Very few institutions, projects, special programs, or NGOs dealing with the agricultural sector are present or they have very limited coverage and fail to achieve widespread impact or sustainability. In addition, those existing institutions tend to apply models foreign to cultural particularities and forms of campesina organization.⁵⁸

In the sector of Pastoruri, irrigation canals have been built to “improve” pastures for livestock. Locals state that support for the canals was secured from PRONAMACHS (the National Program for Watershed and Soil Management, *Programa Nacional de Manejo de Cuencas Hidrográficas y Suelos*), which was an institution during the previous national administration. There are approximately 20 families settled in this sector, all dedicated to raising cattle, sheep, and horses.



Irrigation canals are clearly visible in this photo

Livestock are present in all the valleys, especially in Ulta and Rurichinchay, which have approximately 1,000 permanent head of cattle and Shallap, with about 200 permanent head of

cattle and hundreds of sheep that graze the slopes on daily basis. Cattle in Ririchinchay graze almost entirely along the slopes thereby threatening the polylepis forest; only 200 cattle graze the valley floor. In Ulta, polylepis forests are affected by logging and degradation resulting from constant cattle passing through. The cattle have completely decimated the forest's herbaceous layer, to the point where regeneration is next to impossible.⁵⁹

The fact that pasture users are not monitored or evaluated, despite agreements with Pasture User Committees and their respective regulations, results in environmental conflicts. Without monitoring, there is no accurate information about the intensity or location of overgrazed areas within the park.⁶⁰

Pasture User Committees claim that rustling (cattle stealing) is a central problem. Even though they operate within a protected area, excessive access routes and limited control provide little protection against rustling. Their list of complaints does not end with cattle robbing. They complain of lack of vaccines and treatments for animals, disorder, lack of natural pastures, outsiders who are not members of the user committees introducing animals and grazing, new people continually introducing animals to graze, borders are lacking, animals are untamed, weak, sick, and of low quality, low prices for cattle, invasion of unsuitable pastures, lack of institutional coordination and organization, and lack of training.⁶¹

In 2004, INRENA conducted a rodeo to carry out an animal census. They determined that there are 2444 recognized park users, 9891 cattle, 11,584 sheep, 282 horses, 9 donkey, and zero llamas.⁶²

The park director states that livestock activity is one of the protected area's most significant problems. In an interview, he said, "The number of livestock has exceeded the carrying capacity and overgrazing exists, leaving the park's pastures in poor to very poor conditions. Now, we have worked with User Committees so they do not increase the number of people involved. As a form of "compensation" for using park grasslands, they have to manage tree nurseries to reforest parts of the park. But, one thing we have not been able to control is the number of animals. They started with 100 and now there are 200 or 300—they are reproducing. We tried to control reproduction, but people complain since it is a source of income. One thing that you have to understand is that cattle are like savings accounts for the communities. They don't actually save in a bank but instead they invest in cattle. What they don't realize is this is not the best investment because if the cattle die of old age or sickness, well, they don't ever get the financial benefits they anticipated. To try to help keep that from happening, more technical cattle management is being promoted where old individuals are sold and farmers instead keep younger ones."⁶³

An interview with the director of the Mountaineering School revealed that he had definite opinions about indiscriminant pasture use. He said, "We opened our training school in an old refuge located in Llaca Valley, so we are intimately familiar with the valley and its issues. We have noted that members of Pasture User Associations in Llaca do not want to remove their horses. It is really complicated. If you ask them what good is their horse they will respond that it is their property and it has to be in Llaca because if they take it out, they will have to feed it...But we also know that users sometimes don't even have access because other rural farmers

do not let them in. In Cojup, for example, I know that at least one or two families charge the rest of the farmers who want to keep their animals there. These families charge monthly or annual fees for each animal within the valley. Park administration says that once the rainy season ends, animals should be removed from the park to prevent pasture abuse, but no one ever does it.”⁶⁴

The protected area’s management committee tries to deal with the issue, but they are not very successful. According to one management committee member, “the park’s problem is lack of protected area governance because local people living in the buffer exert enormous amounts of pressure. One priority issue we [the management committee] have seen is related to natural pasture use. There are too many cattle and sheep in the valleys. We are trying to regulate the problem through applying the Master Plan and strategies within sub-basin management plans. Our role as management committee is to provide consultative opinions to seek mechanisms and alliances that create awareness. We take advantage of the fact that everyone participates by sending delegates to the management committee assemblies.”⁶⁵

Tourism

Tourism is a very important activity in the national park. It generates the highest economic return for the protected area and local communities when compared to other economic activities. There are many diverse actors and interests involved in the tourism business in the park including operators, guides, transporters, carriers, support organizations, communities, and churches among others. Taken together, these entities form a complex, interrelated, and sometimes-conflictive network that reflects the profile of the region’s activity.

In several locations, like Llanganuco and Pastoruri, tourism is massive. People engaging in conventional tourism access these places in buses and on tours and usually spend one day. In other places, mostly those places known for adventure tourism, tourists camp and hike for several days. While there is a continual flow of tourists, it is not necessarily massive like in the previously mentioned conventional tourist locations and it is not like tourism along the Inca Trail in Cusco, for example. Mountain ice climbing is in high demand in the region; visitors camp at base camps at the foot of mountains and make expeditions to the summits. Unfortunately, the growth of tourism has also attracted informal operators as well as irresponsible tourists. Poorly managed tourism results in a series of negative impacts including garbage and waste generation, contamination of pristine places, unauthorized trail and road openings, soil erosion, vegetation loss, glacier loss, social differentiation between those that participate in tourism and those that do not, and conflicts.

Tourism in the park is disperses, as are its impacts. It is on the rise and requires more logistical capacity in the park because of high concentrations in certain areas and times of the year.⁶⁶

Ecosystem impacts caused by adventure tourism

Local conservation targets impacted by adventure tourism include preserving mountain landscapes and ecosystems. Adventure tourism circuits have fragmented these conservation targets, especially along the Cedros-Santa Cruz, Llanganuco-Santa Cruz and Ishinca routes. Along these three circuits and every tourist season, an immense amount of residue accumulates,

left by tourists and operators, and the pack animals leave manure that piles up in the camps and base camps. Not only the waste, but unauthorized routes and trails are opened, and the soil becomes compacted and erodes.

Every year before the tourism season begins, park administrators with help from rural organizations in the area of influence carry out a clean-up campaign. Once a year is not enough to deal with the mass amounts of waste accumulating in the base camps, but lack of staff training and systems to resolve the problem means that it persists.

Garbage and waste left behind contaminates water (originating from glaciers), lagoons, rivers, and streams. It can also damage the soil when garbage is buried because it can cause erosion and contaminate the air with putrid odor. There have also been complaints of noise pollution.

Over time, tourism along the climbing routes and circuits are provoking progressive loss of vegetative coverage and increasing perturbations to wildlife in the surrounding areas of influence. The impacts of garbage on affected glaciers and global warming on glacier retreat are still unknown.

Ecosystem impacts caused by conventional tourism

Conventional tourism mostly impacts the park's landscapes. The Master Plan identifies Parón, Llanganuco, Pastoruri, Ulta and Llaca as the main conventional tourist destinations.

Ulta valley has yet to position itself as a tourist destination because of lack of basic services and promotion and as a result, no major negative impacts related to tourism have been identified in the valley. Llaca lagoon is an important destination, but because of the road is in such bad condition, a massive amount of tourists do not go and only adventure tourists visit.



Horse rentals in Pastoruri and a boot-rental shop to walk along the ice in Pastoruri.

Llanganuco valley and Pastoruri Mountain are the most important destinations and concentrations of tourists during the high season surpass the ecosystems' carrying capacity and have a large impact. Main problems include visitor and vehicle congestion, erosion and soil compaction, organic and solid waste generation, water contamination (in the lagoon and glacier), soil contamination, and air pollution because of vehicle emissions. As well, vehicles and visitors generate noise pollution.⁶⁷

On average, 3,000 tourists a month visit Llanganuco, although during the tourism season (June and July) Llanganuco sees up to 7,000 visitors per month. Local associations have formed in the area including a tourist service association, food vendors association, a craftsmen association, and a boot seller association. These organizations confirm that tourism generates solid waste and contamination, garbage is not well managed, and there is a problem with excrements. In both Pastoruri and Llanganuco, horses cause problems because they are close to food vending areas.

The community of Catac unilaterally decided to start charging entrance fees to Pastoruri glacier a few years ago, thereby entering into a conflict with INRENA who does not and has not charged to enter the sector. This conflict has escalated to the point that INRENA is taking legal actions against the community of Catac. Actually, the process is about to be resolved in tribunals. Other communities have learned of Catac's unilateral action to charge entrance fees and want to do the same in other sectors regardless of INRENA's opinion.

In addition to charging entrance fees, the community of Catac charge for other services like horse rentals, vehicle parking, and guiding tourists to the foot of the glacier. Most tourists use these services because of the effects from the high altitude. The horse trail is parallel to the hiking trail and is severely eroded and generates large amounts of dust that affects hikers along the cobblestone-hiking path. The community also sells food, has a lodge, crafts and rents boots. And, despite the fact that the Catac community is responsible for maintaining the area, waste and garbage is often littered about, especially plastic bags.



This photo shows tourists going up to Pastoruri on horse and the other shows soil erosion from all the horse and hiker traffic

Community-charged entrance fees are becoming more and more prevalent throughout the area. In several areas visited during this evaluation, we confirmed that communities are charging entrance fees. One person interviewed gave us some insight into the situation, he said, "This is happening because communities say 'why not?' or 'why shouldn't we charge to get in the park because this is our valley, our ravine...' I remember that before I went to Ishinka and they would charge ½ sol or 1 sol to enter because they cleaned the trails. And, really, that fee is completely reasonable. But now they are charging about 5 sols. In some places, like Tupeyhuanca, if you arrive without a donkey you can just enter, but if you arrive on donkey, it will cost you \$10 dollars to have the gate opened. And, for guides, it does not matter to the community members that you have already paid to get into the park or that you are a guide—they still demand the fee or they won't let you pass... In Llaca, the Pasture User Committee members have become "Llaca's Ministry of Transportation." Supposedly they fix the road and charge \$10 to travel

along it, and when guides gather up their clients and get back into the car after a hike, the community members charge \$10 again. Some of my friends recently went to this area and they told me a way to avoid the second \$10. Basically, they have the taxi wait outside the entrance. They still pay \$10 to get in, but since they walk through the entrance and walk out, they do not have to pay the second time. But, another group that recently went told me that they have raised the price to \$20 per car regardless of where it parks or waits. This shows us that the park administrators are losing the control of the park. We recently received a copy of the Tourism Use Plan's regulations—they are great, but they make you want to cry because as soon as you get out into the field you see all the problems, mostly social. Fundamental authority just does not exist and there is a long way to go to establish community relations. Basically, they have to figure out what the community needs so they don't take the park's administration away from the authorities."⁶⁸

Tourist guides hike Pastoruri glacier even though it is restricted. Many of these guides are informal and do not pay attention to INRENA, they even seem to have more power. Tourists visit the area to experience snow and ice in a tropical mountain range. So, people climb on and walk around the glacier—it is a major attraction. This activity obviously affects the glacier, especially ice climbing because the ice is picked, split and chunks slough off. Local people, from the Catac community, say that guides do not follow established measures. For example, access to the ice cave is restricted, plastic strips are even strung across to make it clear that entry is prohibited, but no one respects the restriction. Catac community members also mention that even though climbing is restricted, foreign visitors come to the area to climb and they pay the most to do it.

Another problem in tourist sectors are vendors and peddlers. During an interview, the director of the mountaineering school explains what has happened in Huaraz. He said, "since I was a boy, I would go to the mountains. I would come across rural farmers checking on their animals and only once in awhile would I run into a foreigner. Now, with tourism on the rise in Peru, there are tourist refuges in the park and people who compete with those refuges, such as street vendors and peddlers. Two years ago, I was in Ishinka and there were a couple of young teens from Huaraz selling sandwiches and soda pop. Apparently, someone had told them that the established lodge in the area had expensive food, so they decided to come an offer cheap food at Ishinka base camp. I was surprised and told them that the park guards were going to show up and remove them from the area. Well, the next week, the teens were still selling. I have not going to Ishinka this year, but colleagues tell me that three kiosks have been set up. This shows that the park administration is getting weaker and losing more control."⁶⁹



Catac community members charging tourists to enter the sector

Typically, conventional tourist guides and agencies (official tourism guides) do not engage in ecotourism activities or incorporate ecotourism standards into their work, which means that

guides need to accept park norms and coordinate with them. Awareness raising activities on their own do not generate sufficient changes in behavior and therefore the park must develop coordination, cooperation, and an effective alliance with the tourism sector.⁷⁰ In general, this group is concerned with short-term economic gain rather than environmental sustainability.

Overall, the park's tourism sector is disorganized. There are informal conventional and adventure operators. Operators typically want the best of the park without understanding the park's true conservation objectives. They seem to be unaware, or they pretend to be unaware, of Huascarán National Park's national and international importance as a protected area and that the State is responsible for leading its management. They fail to recognize the National System of Natural Protected Areas (SINANPE) and demand that entrance fees to the park be reinvested in tourism—unaware that the park has other objectives and functions. Operators do not directly support the park's conservation because they do not pay any operation fees. They do not even indirectly support it because they do not help management actions. The Association of Auxiliary Services of Alta Montaña does not even have a concrete agreement to conserve the landscapes from which it benefits, but at least they do participate in specific activities like park clean-up campaigns and others.⁷¹

According to the protected area's director, tourism is a significant problem in the park. He said, "if we get rid of tourism, the park will be at peace because mining and livestock are manageable, but tourism is very conflictive—there are multiple actors, communities, businesses, public entities, and tourism operators. Tourism is completely unorganized in Ancash, it is so informal and no one respects the norms or complies with municipal or regional ordinances and provisions. Huaraz becomes no-man's land during the tourism season—as a result there is disorder, garbage, trail openings, habitat fragmentation, and unauthorized camps in the park. School groups that visit between November and December are destructive; they paint and write graffiti, rip plants apart, and take music equipment into the park.

In 1997, the Mato Grosso Association had a contract with INRENA to build a mountain lodge. They built Pisco Lodge, which was actually inaugurated by President Fujimori. Afterwards, they received permission to build a lodge in Ishinka and later in Huascarán. Communities protested because they had offered services like carriers and donkey rentals and were affected when this organization also started offering the services like equipment rental, guides, and carriers. The communities felt that the organization had taken away their business. In 2003, there was serious social backlash. There were protests and complaints; so serious in fact that Ministerial intervention was needed to resolve the problem. The proposed solution stipulated that any new construction had to comply with the master plan's guidelines, which is very demanding requiring significant allowances for environmental design and prohibits new construction altogether in many places. However, Mato Grosso Association sought support from political heavyweights in the national government in order to continue with their plans to build a center, which they changed from a tourist lodge to an assistant and monitoring center, that the Executive Commission of the Management Committee has opposed.

Grassroots organizations of carriers and guides are again on alert, troubled that the construction will rekindle social problems. This in turn worries the park's administration because it means that advancements that have been made in the park's management could be truncated or delay

other associated actions. The area Mato Grosso Association proposes for park control is ineffective. If the association wishes to donate and finance the construction of a monitoring and assistance center that would be great, but it should not be built in Aguaycocha Ravine, which is at the base of Alpamayo glacier. Instead, it should be built where it is needed within the park, which according to the Master Plan is in Llama Corral. This has what has been proposed to the agency and they will have to analyze the proposal or develop a control post at Llama Corral in light of this proposal's shortcomings."⁷²

A member of the Management Committee explains the conflict during an interview. He said, "the conflict is that there are three lodges built under authorization from the President during Fujimori's administration. This authorization passed over the park's regulatory documents, like the Master Plan and the Tourism Use Plan, and since then has sort of set a precedent for concessions. As a result, these three lodges do not possess the proper authority and were built without public consensus and without the Management Committee's consent.

The mountain hiking support sector is affected. People involved in this sector are organized in an association that provides expedition auxiliary services by renting donkeys, and providing carriers, and cooks. The Mato Grosso Association is able to out compete these local services because they offer carriers, mountain guides, and equipment rental inside of the park. Within the refuge, we are not sure what permissions they have. When they were told to comply with the Master Plan's norms, they protested. Currently, INRENA is thinking about signing an agreement authorizing a new lodge with another image, located in Alpamayo Mountain—the most beautiful mountain in the world. For Mato Grosso, it is a business and that is why they are exerting political pressure to get the concession for the construction as soon as possible. They are masking the construction as an assistance and glacier-monitoring center. But, in reality, these people do not have any glacier monitoring specialists or other related support projects, like the Alpine Rescue Unit of the National Police or INRENA's Glaciology Unit, that have determined that such a center is needed technically at the base of Alpamayo. Analyzing the proposed infrastructure project, the center includes dormitories, bathrooms—indications that this installation is not intended as an assistance center but as a service center."⁷³

Mining

Mining activities within a national park are not legally permitted. However, mining authorizations issued before the area was declared Huascarán National Park give exploitation rights as long as they follow current environmental regulations. According to the park director, there are 78 mining concessions in the park and 9 concessions currently operating, mostly located in the southern portion of the park. All of these mines were indeed authorized before the protected area was declared. There is no accessible, organized information about mining's history in the protected area. Some existing data has been compiled and from it 59 mines and mining prospects have been identified within the park, of which 17 are considered to have valid mining concessions. In addition, abandoned, deteriorating smelting operations have been found at the bottom of Tuco Valley as have abandoned mining tailings along the southern border of the protected area. These constitute a threat to the soil and water, and consequently, to the ecosystems in general.

With mining reactivated in the Ancash mountain range and the presence of two large mining companies in the transition zone of the Huascarán Biosphere Reserve, Antamina and Barrick, there is growing pressure to reactive some mines and to authorize some new mines near and within the park. The Ministry of Energy and Mines could approve such reactivations and authorizations if INRENA does not modernize its legislation in defense of Peru’s natural environment.

Problems with mining include small mines in compliance with environmental regulations (for example, they dispose of waste in waterways and let tailings accumulate, that produce acidic water conditions). Environmental strategies that would help improve mining’s sustainability within the national park, which based on its categorization is supposedly “intangible” [untouchable], are not available. At the very least, the Environmental Adjustment and Management Program (PAMA) is needed to monitor active mines and those approved since before the park was created, in order to ensure compliance with environmental requirements and respect of applicable maximum standards.⁷⁴

According to the Master Plan, three sites have been identified containing tailings (2 in Carpa Sector and one in Potaca) and 14 sites have been classified as abandoned mining camps (8 in Carpa, 4 in Ichicpotrero and 2 in Potaca). In addition, 26 vehicular secondary roads providing access to mineral deposits have been registered (7 in Llanganuco, 8 in Carpa, 8 in Ichicpotrero and 3 in Potaca), and there are 22 sites with passive mining (1 in Llanganuco, 9 in Carpa, 8 in Ichicpotrero and 4 in Potaca).



Mining impacts

Mining activities impact the conservation targets, landscape, water quality, and certain aspects of biological diversity. Among its impacts, mining acidifies water, reduces vegetative coverage, disturbs wildlife (because of noise and miners turned hunters), and its tailings and waste accumulate thereby degrading the landscape quality.



Artisanal mining of carbon in Chavín

Park administrators do not have a system available to quantitatively evaluate environmental impacts on mountain ecosystems associated with mining in the park. INRENA in coordination with the Ministry of Energy and Mines have failed to produce any supervisory protocol or agreement setting special standards for mining in natural protected areas.⁷⁵

“Latent problems are social problems generated because of the lack of understanding between the communities and actively developing mining companies. When a mining company arrives on the scene, local people have high hopes for development and job opportunities. They think that as soon as mining arrives in an area, a ton of work will be available. When this does not happen and expectations are crushed, the general perception is that the mining companies do not come through with their promises. In reality, there have been cases where this has actually happened and written and verbal promises made with communities were not kept. Also, in some cases, a lot of time passes between initiation and execution and people have grown tired of this, even protesting. In addition, changes clearly related to the area’s ecology and roads have caused some conflicts with communities in the highlands. On two occasions that mining has been introduced, people complained that the dialog was not very transparent or informative. There have been these types of problems. Another problem is that the mines claim to the outside world that they are complying with quality standards, with social promises, and that they have generated a ton of development...yet, such large, influential works are not visible.”⁷⁶



Mining tunnel within the park, and a medium-scale mining operation in the buffer zone

In addition to traditional mining activities, there are also rock and gravel extraction in improvised quarries within the park. These quarries not only generate negative impacts on landscape quality, they affect soil stability and vegetation, generate dust, and introduce heavy machinery. There have been small-scale artisanal extractors who extract rocks for construction purposes or for use in crafts and park administration has been able to effectively control these types of extractors. But, the main player in material extraction from quarries is the Ministry of Transportation, which uses the material for highway maintenance and asphaltting. Its activities seriously affect the park in sectors of operation.



Views of areas within the park where material for highway maintenance and asphaltting are extracted

Illegal Hunting

Because of permanent human presence in the park, illegal hunting is constant. There are also outsiders that come to the park specifically to hunt. Hunting directly affects wildlife. Hunting of northern viscachas (*Lagidium peruanum*) is common, even in touristy areas like along the Huaripampa-Santa Cruz Road. Hunting of whitetail deer (*Odocoileus virginianus*) and Andean deer (*Hippocamelus antisensis*) seems to occur sporadically, although reports from locals and shotgun shells found in several zones suggest that it is more common than originally thought.⁷⁷ The Master Plan identifies 83 sites where illegal hunting is known to occur.⁷⁸

On interviewee states, “In Huaraz there is a semi-secret hunting society. No one knows who the members are, but deer heads and pelts are sold in the city and restaurants there offer venison on the menus. Sport hunting is expensive, gun licenses are expensive, so these hunters are rich and are part of this secret society. I know a few of them, and since I am a mountain guide, people say to me, ‘you know where the game is!’ Sometimes they tell me that they have made a venison barbecue, but then they remember that I am a mountain guide and they add that they hunted the deer in the black range, outside of the park.”⁷⁹

Hydro Power

There is a wide variety of users taking advantage of hydro resources (families, private businesses, and governmental agencies and companies), although the groups demonstrating the highest demand include the Norte Egenor Energy Generator Company, special irrigation projects in Chavimochic and Chincas, and potable water and sewer service providers Entidades Prestadoras de Saneamiento.

Egenor, previously known as Electroperú, is a company created as the result of privatization process initiated during the government administration in the 1990s. The company demands water resources from natural sources (lagoons, glaciers, rivers) from headwaters in sub-basins and microbasins from within the protected area to generate electric energy. Faced with climatic changes, freshwater produced in the mountains is not enough to satisfy competing, multiple needs. To resolve this problem, Egenor proposed damming lagoons located within Huascarán National Park. Their projects are technically engineered and are not designed to consider sustainability of the water resources or ecosystems, which also have other uses.



Dammed lagoon (Llaca Lagoon) and the hydroelectric center in Cañón del Pato.

Actually, Egenor operates Parón and Cullicocha Lagoons. Parón Lagoon has been seriously affected by the reduction of water surface area. Parón Lagoon was an important tourist destination, but it has lost its appeal because its water levels are controlled. Inappropriate management of the lagoon's water resources has reduced its value as a tourist attraction. Egenor has a portfolio of projects that also includes securing the Santa River for Cañón del Pato Hydroelectric Center, and damming Querococha, Aguascocha, Qesquecocha, Collotacocha, Shallap, Rajucolta (aka Tambillo), Yuracocha, Paccharuri and Macar lagoons. There is also a possibility of regulating 35 lagoons that were consolidated for security. The Glaciology Unit's project portfolio includes securing four lagoons: Safuna Alta, Artison, Arhuaycocha and Cancaracá Grande (Chacas).⁸⁰

INRENA and Huascarán National Park's administrators will be deciding on several of Egenor's dam project proposals. According to park reports, a series of ecological and water resource sustainability observations have been made on these projects. However, alternatives that are compatible with the protected area's objectives must be visualized.

Special irrigation projects also demand water resources, such the Chincas Irrigation Project (Santa Valley, Ancash department) and Chavimochic Project (in the valleys of Chao, Virú and Chicama, in the neighboring department of La Libertad) in the lower basin, as do small irrigation projects in the upper basin, and communities that need potable water.

There are a multitude of problems associated with water resource use. There is lack of awareness about environmental protection regulations in hydroelectric activities. There is lack of awareness that water is a limited resource and a water deficit increases over time. There is no register or accounting of water flows and volumes. Related to demand, there is water scarcity. There are no updated inventories of the glaciers. There is a lack of research regarding the amount of water held in the lagoons, glaciers, and rivers needed to design better uses. There are conflicts between user groups, especially during times of low water levels. There is no protocol for information sharing between stakeholders. None of Egenor's payments to the Ministry of Agriculture for park water use goes back into the park for conservation purposes. Water user groups are not entirely organized. There are no prevention, management or control measures for short, medium, or long term water management. There are a lack of policies and appropriate strategies for integral water management. Interinstitutional relations between the irrigation district, users, and involved NGOs are not smooth. There is sector interference in water usage. There is insufficient

information and not enough quantitative or qualitative studies regarding the effect of water use on biodiversity in the lagoons where Egenor operates, although it is clear that artificial fluctuations of the lagoons' water levels provoke ecosystem damage. Construction activities, such as dam building, access roads and secondary infrastructure also cause impacts. There is strong pressure to build additional dams. Existing dams only use water without proper management. Finally, tourism, pastures, and mining all pollute park waters.⁸¹

Additional impacts in lagoons and bodies of water originate from illegal fishing. According to locals, fishing is done with nets. Night fishing occurs during the off-season. And, fishermen add to garbage generation, they even throw it directly into the water. Finally, they can contribute to erosion and create disturbances when they access previously pristine areas.

Management Limitations

Insufficient financing is the park's principal management difficulty, despite the fact that Huascarán National Park generates significant income from charging entrance fees. However, because of SINANPE strategies, this income (as well as income generated in all protected areas) is lumped into a central fund that is administered to maintain the entire natural protected area system. That means that Huascarán's income also goes to support other protected areas that do not generate any income. In the end, this leaves Huascarán with insufficient funds to employ staff needed to efficiently run the park.

Management shortcomings are clear to people we interviewed for this report. For example, the director of the Mountaineering Guide School sustains that the park's problem is a general lack of management. He said, "The administration seems very committed to many conservation plans and development ideas. At the park's entrance, there is a well-controlled gate but beyond that, within the park itself, there is no control—it is another world. In park offices located in Huaraz, you will find dedicated staff, engineers with projects like pasture conservation among others and you think wow. But, you go to the park or if you are in the campo, you run across a park guard who might ask you for your credentials or might not, they do not seem to care who enters the area and as a result the abuse inside is incredible. One very complicated aspect I have seen is that there is so much informality, and this informality is growing and will bring about serious problems."⁸²

A foreign tourism operator stated, "I do not know about the money, but what I can say is that I do not see much money being spent around here. I know that, for example, on July 28 of last year the park made thousands of dollars in four days in Llanganuco—which is a lot of money to build infrastructure and create jobs. But, all that money goes to Huaraz and Lima and very little comes back. It comes back as park guard salaries, but roads and trails are not cleaned or maintained and the system for charging to enter is poor."⁸³

A member of a local NGO told us, "we have experienced some discrepancies and we have had discussions with outsider NGOs who come here to work, it is a delicate topic. A lot of times, we are fighting with these outside NGOs that manage huge investments. For example, the "Fund" (Cochao) is working now with about \$US 600,000, and DESCO has about \$US 1 million dollars to work to strengthen local capacity and work with some development, like irrigation. What we

see is a bunch of bad choices and money just slips away, and when people and NGOs see that there are no results, well there are a lot of difficulties.”⁸⁴

Future Threats

Glacier Reductions

The mountain range’s summit, once completely white with snow and ice, now shows dark streaks of uncovered rock. In the last decade, the glacier covering Pastoruri, one of the most famous in Cordillera Blanca, has retreated 200 m. Like other glaciers in the country, it may soon disappear. Peru is one of the countries most affected by climate change in the world. It is home to the most tropical glaciers in the world and is situated between the tropics where the sun’s rays are particularly inclement. Peru is especially vulnerable to high temperatures. Experts predict that all of Peru’s glaciers below 5,500 m altitude will disappear before 2015. This represents most of Peru’s glaciers. Marco Zapata works for INRENA in the Andean city of Huaraz. Zapata has studied glaciers for the last 30 years and he confirms that Peru has already lost 20% of their glaciers.⁸⁵

Humans cause the threats facing the park’s hydro resources, both on a global and regional level. The first threat is from global climate changes that are causing glaciers to retreat, leaving soils derived from the very glaciers unprotected. Another threat, which is probably the most serious, is inappropriate use of hydro resources that requires a change in management.⁸⁶ In addition to the fact that global warming has caused a 15% reduction in glacial extension in Cordillera Blanca, the impact of local activities, like burns, dirt roads and dust generation, among others must be taken into account as well.⁸⁷

Cordillera Blanca glaciers are suffering from a continued, very critical retreat process. “Pastoruri is rapidly retreating, we no longer consider it a typical glacier. Instead, we consider it a cover or a small ice cap. We conducted an evaluation in 1995 and determined that Pastoruri glacier’s area was 1.8 km². Six years later (in 2001), we repeated the evaluation and found that it had reduced by 0.5 km² (to 1.3 km²), which is significant. We plan on measuring the glacier again this year, and we expect that it will be even smaller. What is happening is that its lower boundary keeps ascending, that is, it is retreating to upper altitudes. I would say with confidence that we are witnessing an irreversible trend.”⁸⁸



Ice cave in Pastoruri, which has been heavily visited over the years. However, now because of thawing, the cave has disappeared

The expert at INRENA's Glaciology Unit told us that one of the fundamental objectives is to observe glacier behavior. He said, "the first research in Cordillera Blanca began in 1967 and since then, we have monitored the range's glaciers. The results we have obtained are troublesome. Especially starting in 1977, glacier retreat began accelerating. This means that freshwater reserves in solid state stored in these glaciers are reducing and in the future water scarcity will become a problem.... Mountain communities depend on the water from glaciers. Beginning in May, when water levels are low, until September, the water regime (river flows) depends on glacial melting. It is also the time of year when most problems will be felt. Don't forget that in the department of Ancash, water from Cordillera Blanca is used for human consumption and in agriculture, hydro power, mining, agro-industry like Chavimochic and Chincas, and for irrigation of Chimbote and Casma. And for tourism, the lagoons and glaciers are major attractions as one might expect. Based on the rate of glacier retreat, these glaciers will disappear over a relatively short period of time, geologically speaking, and these tourism activities will be seriously affected."⁸⁹

One member of the Regional Government of Ancash told us that they are preparing for climate change. He said, "in the Santa River basin there is a project assessing vulnerability and climate change adaptation underway. We cannot stop it [climate change] and it will continue until only a few glaciers are left. What we have to do is adapt. Climate is going to change and river water levels will go down. We will only have water during February and March, when it rains, and during periods of low water levels, we will have to adapt. First, we have to determine how vulnerable we will be, and work from there. That is where we are now."⁹⁰



Ice climbing generates breaks and causes parts of the glacier to fall off. The second picture shows signs of glacier retreat



A cloud of smoke is formed by burns, and it can travel great distances affecting the glaciers

Recommended Solutions

The most effective way of handling threats and difficulties in Huascarán National Park in the short and medium term is to follow the Master Plan by strictly and efficiently implementing its recommendations in a creative way and in coordination with local stakeholders. Designing and developing long term strategies should be done according to the protected area's objectives and captured in future master plans that not only reflect but nurture the area's evolutionary processes along its management. We would like to highlight several of the Master Plan's general recommendations: Orient work in restoration zones, regulate firewood and grass use sustainably in each valley, promote raising native species, design mechanisms to manage native grasslands, improve and implement environmental education programs to eradicate negative impacts generated by Pasture User Committees, regulate sanctions for infractions, and strengthen interinstitutional relations.⁹¹

Loss of vegetative coverage

Vegetation removal and burning must be strictly prohibited in Huascarán National Park. Controlling burns must be improved and intensified urgently. Awareness must be raised and therefore propaganda and information dissemination are needed. All media sources should be used: radio (for the rural areas), newspaper, and local television in urban areas around the protected area in an effort to stop burns and wildfires. In farmed and eroded areas within the park, soil restoration should be initiated.



Reforestation in Querococha sector

Forests within the park must be continually evaluated, both their extension and state of conservation, especially the threatened *Polylepis* forests. The register of flora species should be consolidated and their coverage verified in the field, with help from existing satellite images.

The protected area's management has recently completed a queñual reforestation campaign (2005). They reforested 13.23 hectares with 31,770 *Polylepis racemosa* and *Polylepis Incana* seedlings. Along the Cahuish – San Marcos route, 8,000 queñuales (*Polylepis Incana*) were planted. Twenty-four forestry nurseries were conditioned in coordination with the nurseries' directors, user group leaders, and forestry promoters.⁹² These reforestation actions should be advertised and encouraged in other sectors of the protected area and promoted with local stakeholders.

We also recommend raising awareness about *Puya Raimondi* protection and disseminating guidelines for managing cattle so they do not affect this endangered flora species. Park administration and the judicial system should be unyielding and sanction anyone who is found guilty of destroying *Puya Raimondi*. Precedents need to be set to show possible law-breakers that the park's management is serious as are the sanctions so that they will respect the park staff's authority.

Coordination with local leaders and mayors of towns closest to the park must be strengthened in order to achieve participatory vigilance and control and related, continual training will be needed. Agreements should be reached with involved communities and organizations to maintain high standards when it comes to control and vigilance. Communication and response mechanisms must be established between local representatives and park administrators so that any denouncement is dealt with expeditiously. Local vigilance and control representatives must be given the capacity and authority necessary to detain lawbreakers long enough to turn them over to the corresponding authorities.

Corresponding agencies, such as the Ecological Police and Forestry Division of INRENA, should control and supervise firewood collection and sale. Any vendors offering firewood from queñua or quishuar should be sanctioned. Once vendors' demand for these woods decreases, rural collectors would begin to offer alternatives such as molle, tara, eucalyptus, and pines that

can be found outside of the protected area. National Police posts along the highways should play a more active role to stop illegal logging and transportation of unauthorized woods to large markets in Lima, Huaráz and other cities. Pasture User Committees operating within the protected area should also play an active role in fighting against removing vegetation and extracting firewood.

Sanctions should be established against lawbreakers, including middlemen vendors and rural firewood extractors. Those firewood collectors caught red-handed should be sanctioned with fines and their mules held until they pay. Restaurants that use firewood, like pizza places or chicken rotisseries, should be supervised in order to identify their suppliers and origin of the firewood used. Those restaurants that continue to purchase unauthorized firewood originating from the protected area should be sanctioned.

Livestock

Close collaboration with the Pasture User Committees, in which they actively participate, is essential to guaranteeing conservation of the pastures, forests, and associated species. Coordination between the user committees and the park's administration should be increased. User committees should receive training in management aspects and in alternative livestock options (other than cattle). They should also receive information and training on organizational aspects, as well as the legal issues and regulations associated with their activities and the park.

In an effort to address this deep-rooted problem in the short term, additional research is needed. Data must be collected and variables related to livestock activity understood in order to select and apply the administration's sustainable management proposals. The park director told us, "We have proposed a model, an ecological design for livestock management. There are many variables that have not been taken into account and that supposedly were implicit because the information apparently existed. But at the time when the model was designed, when we had to get the input information for the variables, like pasture growth rate, cattle mortality rates, number of heads of cattle per hectare, it was unavailable for the park. Over the last twenty years, we had focused on gathering data about how many cattle were in the park. The model has not been applied because we do not have all the input data for the variables, but we are collecting it to apply the model. We hope that with the communities and with the support of the World Bank Project GEPAN we can provide the users with economic alternatives outside of the park and they can leave the park and their livestock activities behind."⁹³ During this interim time, the park administrators should maintain strict management of livestock, especially of cattle, within the park. They should remove incentives to continue raising cattle by applying park established management regulations, agreements and directives, which would in effect make it unattractive for rural farmers to keep their cattle in the protected area.

Park administrators should conduct round-ups, capture and keep cattle found to be in violation of the established management norms and the owners should be fined for each animal captured. Prior to implementing such actions, an organized system of sanctions and charges must be established and legitimized via ministerial resolution, directorate resolution, or at least INRENA management resolution so that park guards can proceed to act against cattle in violation. The regulation must explicitly list infractions and fee scales and should be

promulgated as soon as possible. The administration should strictly implement the park's zoning and territorial plans and forbid users from violating established guidelines and zoning agreements.

The national park is national heritage. Those users taking advantage of the park's natural resources are gaining personal benefits at the cost of the area's integrity. Because of this, some sort of fee system for using natural pastures must be implemented as a compensatory mechanism or way to finance conservation in the park, especially targeting large-scale producers with many cattle. Guidelines and fee scales are needed per head of cattle within the park. We do not recommend prohibitive prices, rather charges that are inline with local incomes and the economy. Claiming that the locals living around the park should not pay user fees because they live in extreme poverty is not justified because someone who owns 30, 50 or 80 head of cattle is not in a situation of extreme poverty. Any livestock payment made would be a financial resource for the protected area and could be used to promote camelids as an alternative to cattle.



Instead of cattle, raise native species like those of the Auchenia genus

Within the research program, park administrators should include a specific component to monitor and evaluate livestock activities in the zone. The administration should promote mechanisms to replace traditional cattle with native species, such as llamas and alpacas. Raising alpaca and llamas and managing vicuñas and guanacos is something indigenous cultures did before the Europeans arrived with non-native species like cattle, horses, sheep, pigs, and goats among others. Species of the Auchenia genus should be promoted and incentives created to encourage herders to opt for these species rather than horses and cattle. Projects should be implemented that create added-value products with the wool and search for new promising markets for quality products.

Productivity should be increased in areas around but outside the park to reduce pressure for pastures within the park. Ideally, financing should be sought to buy rural farmers' young cattle and to keep older cattle from reproducing to guarantee depopulation of cattle over the medium term and then the transition to native species can be made.

Tourism

Tourism should be strengthened in such a way that it is transformed into a mechanism to support conservation and drive sustainable development. The Tourism Use Plan should articulate site specific plans and effective control should be reached through applying tourism regulations.

Tourism within the park is leaving behind serious negative impacts, especially because of waste generation. Park administrators must take on additional actions to attempt to get a handle on this

problem and that will take them away from their primary functions protecting and conserving biodiversity. Subsequently, interinstitutional strategies focused on sustainably managed tourism must be designed in the park.⁹⁴

An organized garbage management system must be implemented urgently. The Master Plan proposes several alternatives to manage solid waste generated by tourism and these should be refined and applied, at first in a pilot program and tested until an efficient system is defined in each case.

The first strategy proposes shifting garbage management to those responsible for its generation, that is, visitors will have to carry out any garbage produced. Each visitor and/or his guide or agency representatives will receive one or more bags depending on the size of the group and their intended length stay when they pay their entrance fee. The person receiving the bags will be responsible for returning them full of any waste his/her group generated during their visit. The bags would be registered with the visitors' entrance ticket number to keep track. With this identification number, any agency or guide that leaves trash in the park could be identified and possibly lose their operation licenses or rights to enter the park. The Tourism and Recreation Use Regulation details specifics for carrying out this measure. For individual visitors, incentives are needed so that they too will take responsibility, patrols are needed and guides and user committees could be used in this capacity. A list of lawbreakers will be published on a yearly basis, and another list of people involved in working to minimize impacts through innovative alternatives will also be published.

Another strategy is employing a clean-up service; generally, parks contract organized community groups to take a certain route. They would have to keep routes and camping areas clean (bathrooms have a separate treatment), and a park staff member supervises their work. Entrance fees for the different routes would pay for the service along that specific route, although fees must increase to cover the costs and these costs must be determined before starting the service. This service would complement the first strategy in which visitors and guides would be expected to remove any waste generated.⁹⁵

The Ancash Regional Office of Tourism should be encouraged to participate in the park's tourism usage as appropriate. Currently, the park is covering certain responsibilities that actually correspond to the Regional Office of Tourism, like control of informal guides, agency legality, and promotion among others.

The park director stated, "The park's ecotourism plan outlined many strategies for tourism. Recently, a regulation has been approved that will order tourism in the park. Locals were registering so many complaints, it seemed like we [the park] were functioning like the Ministry of Tourism (MINCETUR). We must order tourism within the park, there is no doubt about that. It is hoped that the protected area's tourism regulation will help MINCETUR, the corresponding agency, organize tourism outside of the park. Four additional park guards have been incorporated to gain more control and coverage in the area."⁹⁶

We also recommend conducting a detailed and ongoing evaluation of the tourist lodges and other operations working within the park, both of their direct environmental impacts (infrastructure,

personnel, and logistics) and associated impacts as they offer tourism services, such as visitors' impacts, concentrations of visitors, and relations/conflicts with other tourism agencies. If these operations are found in violation of the norms and procedures, they should be fined or sanctioned.

The president of the management committee told us about that committee's vision for tourism in the park. He said, "We are requesting that UNESCO conduct socio-environmental, cultural, and economic evaluations and monitoring to measure the lodges impacts (for example, Mato Grosso). Regarding the planned lodge, the most logical solution we have proposed is that this investment comes from a donation that will benefit INRENA, and as the director states, that is not built wherever the organization wants, but in the zone called "Llama Corral," which is zoned for recreation in the valley and where more entrance fees could be collected. This strategic spot, outside of the wildlife zone, is our proposal. We are not tangentially opposed or launching a campaign against the beneficial objectives of the project, but what we are trying to do is seek an environmentally friendly alternative to the existing idea given that a national park is the strictest conservation category for a protected area, and because UNESCO recognizes Huascarán part of its world heritage network. We believe that economic management and tourism should be developed in buffer zones. That is our proposal as the Management Committee."⁹⁷

The carrying capacity of tourist destinations within the park should be estimated, especially in Pastoruri and Llanganuco. Tourism impacts on the glaciers should be evaluated; especially Pastoruri, and an access and behavior proposal should be developed. We recommend that the proposal consider restricting access during times of glacier augmentations.

Management control actions must be supported so that tourism is responsible. Coordinator of the Ancash Association stated, "Diverse organizations working in the zone, like Ancash Association, Cuntur, and Instituto de Montaña (Mountain Institute), have proposed training, and park guard training, because one of the problem mentioned by park staff is that they do not have any control. There has been a debate for several years about park treatment, focused mostly on treating tourism activities. There are several points of view and positions; some positions are completely conservation-oriented promoting no use and other positions are for tourism, promoted by tourism operators. With this debate, we can get to more concrete positions, but if the Huascarán Work Group had norms and a control system in place, well then guidelines could be formulated to direct entrance to the eastern sector, the number of people, the season, and location of activities."⁹⁸

The president of the provincial Chamber of Commerce stated, "The first step is to conduct workshops with all the park users so that they work under park regulations and to separate those who come to the area to operate without authorization. There should be two or three workshops about the park's regulations with locals, official guides, mountaineering guides, and carriers so that they understand those regulations and are obliged to comply. It is fundamental because these regulations have been ignored too long, and the park turned into no man's land, considering that there are 42 entrances, it is really hard to control."⁹⁹

Ideally, the park's tourist offerings should be diversified to mitigate impacts on places or specific activities, like along ice trails on certain glaciers, and also to increase income for the park and

local communities. “Tourism depending on mountaineering lasts 4 months out of the year. This is the problem, because in more than 15 years of mountaineering, there are no other alternatives. We should have kayaking and canoeing, make mountain biking routes—cycling opportunities here are incredible—, and establish paragliding courses among others. If this works, we will have tourists 9 months out of the year and that means income for the park. Additional infrastructure would be needed and publicity, actually infrastructure takes precedence to everything else.”¹⁰⁰



This photo demonstrates proper management of tourist infrastructure

Tourism development in Callejón de Conchucos should be given more attention. The coordinator of the San Marcos Pro-Environment Commission told us, “there is a lot of talk about the Cátac-San Marcos highway that is about to be completed, and this will bring a lot of tourists to the area. What we want is to be prepared so that tourists don’t just enter on their own wherever they want, but we want to design trails and routes to keep them in authorized areas and protect the park in that way, because this area [near the new highway] is still a virgin area and currently, there are not many tourists.”¹⁰¹

Mining

Mining impacts on the soil, rivers, lagoons, and other sources of water must be diminished. Even though mining rights were granted before the park was declared, any mining activity occurring within the park should be discouraged. Environmental mining norms and regulations associated with protected areas should be strictly applied in existing mining operations and any environmental impact should be impeded and its intensification or expansion limited.

In the buffer zone, mining operations and concessions should be continually supervised in close coordination with the Regional Office of Energy and Mines so that, via legal resolution, any mining operations found to be in violation of requirements, including incompliance with agreements in their environmental plans required by law, be sanctioned. The park administration, with help from SINANPE directors, should establish necessary coordination with the Energy and Mine sector to strictly apply the Environmental Adjustment and Management Program (PAMA) in each and every mining operation. Equal efforts should be implemented to prevent and/or resolve potential/existing conflicts between mining companies and local people.

According to legislation, any activity present in a zone at the time a new protected area is declared maintains its user/operation rights. Investments, operations, concessions, and contracts in place at the time of a protected area’s declaration remain and cannot be removed. This is the case with the mining operations in the zone. Therefore, if they cannot be removed, they must comply with environmental laws and standards. They should operate according to the Environmental Adjustment and Management Program (PAMA) and follow guidelines and stipulations in environmental impact studies and management plans completed before the operation began and must be in compliance with corresponding legislation.¹⁰² Any illegal and informal mining activity should be eradicated.

Interinstitutional coordination should be strengthened. “INRENA is not the legally qualified agency to sanction or close mining operations, which is why a cooperation agreement has been signed with the regional mining division. INRENA provides logistic support, because the regional mining division does not have any trucks or equipment to carry out monitoring. The regional division in coordination with the park supervises mining and the regional division gives orders to close, sanction, or otherwise demand mining operations to comply with environmental management plans.”¹⁰³

All the mining operations, including those operating in the buffer zone, should be part of the Huascarán Work Group and provide information about their progress to apply their environmental management systems. Local authorities should require that mining companies and the Ministry of Energy and Mines provide them with the results of the periodic control and monitoring of liquid effluents and river water they are required to do per the law.¹⁰⁴ In this way, involved sectors would be informed and could denounce or exert pressure if and when the mining companies fail to comply with established standards and limits.

The Ministry of Transportation that extracts materials from quarries from within the protected area to maintain and build highways should use quarries from outside the park and avoid creating major impacts on the park’s soils and landscapes. Areas already impacted by their activities should be rehabilitated, to replace the soil and landscape quality. Their equipment should be used properly and waste optimally managed, from oil and fuel waste to staff generated trash. Activities should also correctly deal with any associated vegetation clearing. Clearing from slopes, sensitive valleys and landscapes should be avoided altogether.

Illegal hunting

Control of illegal hunting must be improved or intensified as soon as possible. To reduce the potential threat of illegal hunting, the protected area’s administration together with the National Police should confiscate arms from carriers who lack proper licenses and should control those gun carriers with licenses.

The law should be enforced to its fullest extent and people caught hunting within the park, selling endangered species’ parts, or in possession of meat, skins, bones, or live young should be sanctioned to serve as an example to others. To implement legislation related to this aspect, direct coordination is needed between administrators and political and judicial authorities, such as the National Police, the Sub-prefecture, and the Justice of the Peace among others. A clear and explicit message should be disseminated to the general public that those found guilty will be given jail time. In the short-term, the protected area’s administration should concentrate efforts on capturing an illegal hunter to establish a precedent that will serve as an example and dissuade others from trying or continuing to affect the park’s fauna. At the same time, fauna registries and inventories should be consolidated, work done per sub-basin, ecosystem, and ecological niche.

It should be stressed that any introduction of aquatic species in the bodies of water must be prohibited, as should trout development activities. Fishing should be permitted on a subsistence basis only for local people with authorization from the park.

Hydro Power

Impacts created from the generation of electric energy on the soils, rivers, lagoons, and other bodies of water must be reduced. New dam projects within the protected area should be limited. Those in operation should be strictly supervised and must comply with environmental norms established by the Ministry of Energy and Mines. This includes following up on environmental impact studies, management and adjustment plans, and ensuring that the operations strictly follow INRENA protected area norms and water use regulations. Similar efforts should be implemented to prevent and/or resolve potential and existing conflicts between hydro companies and local people.

Glacier Reductions

Because a large-scale, global phenomenon is to blame for the glacier reductions, the solution is not to be found at the national level. Signatories of the Kyoto Protocol, who are committed to reducing greenhouse gases, must comply with set goals and agreements. Countries who have not yet signed the protocol must do so and begin implementation.

At the local level, there are some measures that will help protect and restore glaciers. “Contingency plans for Pastoruri should be developed knowing that ice accumulates and augments the glacier during the months with high precipitation, from October to March or April. During that time, the glacier should be closed to visitors to enable the glacier to grow.”¹⁰⁵

National Park Physical Reorganization

The necessary process to physically reorganize the park’s borders generates potential conflicts with neighboring communities. Thanks to improved satellite technology, park border markers are more precisely placed. Establishing new borders is complicated because it will cause the park to overlap community property in some areas, yet other previously protected areas will be excluded from the park and vulnerable to intervention. Both scenarios generate conflicts because community members complain that their lands are affected or the communities fight over access to territories left outside of the park borders. This process should be carried out according to corresponding norms. Community access to new areas outside of the park should be conditioned on collective and organized access whose sole objective is sustainable use and management. Future parceling or selling of these lands must be prohibited.

Management Limitations

Management limitations could be improved with more effectively designed patrols and better distribution of personnel. The director of the mountaineering school raised some interesting points during his interview. He said, “the park should have more continual presence in the field; I mean the six guards at Llanganuco sell entrance tickets and raise the gate. Instead of having six there, guards should be stationed like they are in Aconcagua, where there are park guards in three separate camps that have radio communication for reporting problems or requesting immediate help. For example, one camp can report a group that is illegally dumping so that they can be sanctioned once they return to the exit station. But, here it seems that the park staff are just

interested in the fact that you entered and paid your \$US 21 and it does not matter what you do once inside. The regulations say you cannot build campfires, that you cannot do this or that. Of course, I cannot kill either, but if I do it someone has to come after me and prove that I did it. But, if guards are only going to stay at the gate, they will never know what I did inside, like if I burnt down a forest, they will never know who did it and they won't find out about the consequences of the disaster. The rules have been made, now what we need is that the park functions well enough to implement and enforce the rules.

INRENA has the responsibility of making social contact with the communities; they have to approach communities, negotiate with them, make sure they clearly understand the regulations, and they have to guarantee regulation compliance. If animals are supposed to leave the park during certain parts of the year, well they should go. If the gates are supposed to be open during parts of the year, they should be open whether or not the road is in good condition or not. The regulations stipulated in user group agreements state that on June 1st, gates are opened and the animals are to leave the valleys. I have never seen any animals leave at this time, only when they are taken out for sale. The rest of the time they remain within the park, violating the agreement. The rural farmers do not comply, but they are not obligated to comply either.

Regulations in the Tourist Use Plan are currently unenforceable because tourists will only comply if they see a group of patrolling park guards on the trail, which happens in Cuzco along the Inca Trail. There you cross paths with red-dressed men collecting garbage with their garbage pickers, making it impossible to ditch the trail and go off on your own because they will see you. They will see you if you try to make a campfire in an unauthorized zone. But in Llanganuco, Santa Cruz you don't see anyone, not a single sole—it is even worse in other valleys. Basically, lack of presence is the problem in the park—not necessarily in Huaraz or the gate at Ulta or Llanganua, but inside the park along the trails, even the most commonly traveled and popular trails, making litter and campfires possible.¹⁰⁶

We recommend that the park's administration exercise more control over NGOs working in the protected area. The park must become familiar with their project plans, objectives, and methods to help avoid duplication and optimize productive coordination to yield complementary efforts and minimizing possible conflict. All NGO activities should be in agreement with protecting and conserving the protected area and in harmony with the communities and neighboring people.

Education

In general, information is lacking. “What we all need to know is exactly where the park's borders are. Requests have been made to the park's management committee and those within Huascarán Work Group so that information workshops can be held in San Marcos and Huari to know exactly what land is parkland. People are uninformed; they do not have good information about the park. It is quite opposite actually, from what they have gathered, protected area officials are trying to take over the park and keep everyone out. Because of their uneasiness, information workshops have been requested.”¹⁰⁷

We recommend implementing existing education and information proposals. The education component should be an integral point of all of the master plan's programs while at the same

time it should support the relationship between the park and local people in an effort to fulfill its objectives. The education subprogram is designed according to the master plan's goals and the park's objectives. The program's priority is to help mitigate threats and its target audiences (in order of importance) are natural resource user groups, visitors, schools, and finally the general public.¹⁰⁸

INRENA's Natural Protected Areas Agency should reach out to board of directors of user committees within the park, to neighboring campesino communities and organizations, and to other groups like irrigation districts, cattle committees, tourism committees, and mothers' clubs among others to: 1) increase understanding of the norms and provisions, 2) strengthen potential development proposals, and 3) generate a harmonious and efficient participatory process. Awareness raising, motivational, and informational workshops should be more frequent for residents and users and education activities should be inserted in schools and educational institutions.

Regional inhabitants do not value the national park as they should. A culture of conservation should be formed and educational opportunities provided that promote values, knowledge and create support of the park's management. Appropriate communication and dissemination methods are needed to make information available to the average citizen. In addition, research should be strengthened in local, national, and international research centers to increase understanding of the \ state of conservation of the park and its resources.

The professional staff and park guards should receive additional training to strengthen capacity and technical skills to better reach institutional objectives. At the same time, appropriate monitoring and evaluation mechanisms are needed to measure conservation advancements in the park and its resources. A training and evaluation system should be implemented for issuing and renewing operation licenses. Pasture User Committees should be included in workshops to raise awareness and close the gap between users and park administrators.¹⁰⁹

INRENA has published the Interpretation Manual for Forming Local Guides in Huascarán National Park and has created the Training System for Certifying Tourism Operators in Huascarán National Park. Both tools should be promoted to tourist operators and implemented efficiently.

“Information needs to reach various levels, to the institutional level and grassroots level. Information concerning the potential of the natural resources, restricted sites, zones where pasture use is permitted, zones appropriate for tourists, etc. This information is needed at the institutional, municipal, and social grassroots association levels... What is needed are information workshops that tell people exactly where the park's zones are, which is the core zone, buffer zone, and transition areas that exist on this side of the park. Based on this, work proposals can be generated to distinguish the potentials existing in the zone and to determine how to conserve these natural resources. If we are talking about tourists, how do we make it so that tourists can use the park, which areas have restricted access, because this is where conflicts can arise with people settled in park. There are a lot of people living in the zone that think they are the owners, but the park has its regulation and norms, and when a zone is declared an

inaccessible zone, there will be conflicts. Work should begin with capitalizing on the park's potentials and determining how to work with local people."¹¹⁰



Mount Huantsán seen from Wacheqsa valley in Chavín.

Conclusions

Huascarán National Park is an important natural protected in Peru. Because of its mountain biological diversity, well-conserved forests, archeological complexes, and extraordinary landscape values, it has been internationally recognized and named a Biosphere Reserve and World Heritage Site.

Huascarán National Park extends 340,000 hectares in north-central Peru, in the department of Ancash. The protected area's primary objectives include conserving biological diversity, natural values, spectacular landscape features, ecosystem qualities, and water supplies for the region's development.

Huascarán National Park is subjected to a series of threats, including loss of vegetative coverage, presence of livestock, tourism, mining activities, illegal hunting, hydro power projects, management limitations, and global warming that is causing reductions in glaciers.

Pasture burns that spread out of control into wildfires and indiscriminately consume native vegetation and habitat are a leading cause of vegetative coverage loss. Another important factor that reduces forest coverage is firewood collection, followed by clearing for agricultural purposes. Increased human populations inside of and surrounding the park also cause loss of natural vegetation. Livestock within the protected area further accelerate the problem.

Livestock activity in the park creates other problems as well. Poor resource management and little technical experience characterize small-scale livestock raisers in and around the park. Natural resources are lost and deteriorated (water, soils, high Andean prairies), as is the quality of the cattle. Over grazing, too many cattle, and lack of knowledge about raising cattle in stables

are threatening the natural pasture's biodiversity, soil quality, and causing progressive loss of vegetative mats that help retain water. Livestock is one of the protected area's most significant problems.

Tourism is an extremely important activity in the park as it generates the most income for the protected area and local people. Improperly management tourism however is creating serious, negative impacts such as garbage and waste generation, contamination of pristine places, unauthorized trail openings, soil erosion, loss of vegetation, and glacier impacts. It is also creating a social divide and even conflicts between people working and participating within the tourism industry and those who are not.

Mining activities within the park that began before the area was declared a natural protected area are allowed to continue and several exist today. However, small-scale mining operations do not comply with environmental norms (for example, they dump residuals in water courses and allow tailings to accumulate, which produces acidic water). Mining activities affect conservation targets, the landscape, water quality, and certain components of the area's biodiversity. Waters become acidified, vegetative coverage is reduced, noise pollution disturbs wildlife, hunting directly impacts wildlife populations, and waste accumulation degrades the visual quality of the landscape.

Human presence in the park means that hunting is a continual problem. In addition, there are outside hunters who come to the area specifically to hunt. Illegal fishing creates additional impacts in lagoons and other bodies of water.

Hydro resources are in great demand for energy, to irrigate fields, for human consumption, and tourism among others. The hydroelectric power company has proposed damming lagoons located within Huascarán National Park to guarantee a constant water supply, which would alter the environment and impact the park.

With regards to park management, the biggest obstacle is insufficient financing.

Glaciers within Cordillera Blanca are retreating at alarming rates. Global warming and inappropriate use threaten to destroy one of the park's most precious resources.

The most effective strategy for dealing with the problems and impacts in Huascarán National Park in the short and medium term is to strictly and efficiently follow recommendations provided in the Master Plan. This will require both creativity and increased coordination with local stakeholders.

Clearing and burning must be strictly prohibited in Huascarán National Park. Control over the burns must be improved and intensified as soon as possible. Awareness must be increased through an aggressive propaganda and information dissemination campaign.

Efficient sanctions should be established to punish firewood harvesters and vendors. Instead of traditional livestock, native species should be raised and llamas and alpacas should be promoted instead of cattle. Incentives should be provided to encourage people to raise species of the

Auchenia genus instead of cattle and horses. Projects could be implemented that would promote creation of value-added wool products and search for suitable, profitable markets.

Organized waste management is needed in Huascarán National Park. The Master Plan proposes several alternatives for managing solid waste generated by tourism. These alternatives should be refined and applied, first on a small-scale pilot project level, then improved to define the most efficient system.

Tourist lodges must be evaluated in detail and on a continual basis. Their environmental impacts should be evaluated as well as their tourist services. Carrying capacities must be determined for the most popular tourist destinations within the park. Tourism impacts on the glaciers should also be evaluated and an access and behavior proposal developed for the glaciers. If necessary, access should be restricted during periods of glacier augmentation.

Impacts created by mining activities on the soil, rivers, lagoons, and other bodies of water must be reduced. And, even though mining rights were granted to those operations in place before the protected area was declared, all mining within the park should be discouraged. Strict regulation is a must, ensuring that mining operations follow environmental mining standards and protected area norms. Impacts on the environment should be prevented and mining operations should not be allowed to expand or intensify.

Illegal hunting should be more intensely controlled. The protected area administration in coordination with the National Police should implement an arms confiscation program, taking arms away from those people without proper licenses, and they should better control those with licenses. Fees and sanctions should be implemented for any illegal hunter caught.

New dams within the protected area should be prohibited and those already operating should be strictly supervised to ensure compliance with established environmental regulations.

Management limitations could be improved through more efficiently designed patrols and personnel distributions in the area. Existing education and information proposals should be implemented. The education component is an integrated focal point of the Master Plan's programs and could help to improve relations between the park and local people, thereby improving the park's ability to reach its conservation objectives.

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- ⁹⁵ Plan Maestro del Parque Nacional Huascarán 2003 – 2007. Intendencia de Áreas Naturales Protegidas. Instituto Nacional de Recursos Naturales INRENA. Enero 2003. Pág. 149.
- ⁹⁶ Interview with Juan Carlos Castro Vargas, Huascarán National Park Director, INRENA on August 5, 2005.
- ⁹⁷ Interview with Jorge Martell. President of Huascarán National Park and Biosphere Reserve Management Committee, on August 16, 2005.
- ⁹⁸ Interview with Agustín Vásquez. Coordinator of project monitoring and evaluation, Ancash Association on August 5, 2005.
- ⁹⁹ Interview with César Moreno Huerta. President of Huaráz Provincial Chamber of Commerce on August 8, 2005.
- ¹⁰⁰ Interview with Alex Goods. Tourism operator TheWayInn.com on August 7, 2005.
- ¹⁰¹ Interview with Antonio Marcelino Barreto. Coordinator of the San Marcos Pro-Environmental Conservation Commission on August 8, 2005.
- ¹⁰² Directoral Resolution: Resolución Directoral No. 036-97-EM/DGAA of December 20, 1997. This resolution approves the norms for presenting actions and investment programs and the percentage of monthly physical advancement of the Environmental Adjustment Plan (PAMA), and monitoring and supervising the obligations set forth in the Environmental Management Plan. December 20, 1997.
- ¹⁰³ Interview with Juan Carlos Castro Vargas, Huascarán National Park Director, INRENA on August 5, 2005.
- ¹⁰⁴ Regulation for environmental protection in metal mining activities. DS 016-93-EM of May 1, 1993.
- ¹⁰⁵ Interview with Marco Zapata, Glaciology Unit coordinator with INRENA in Huaráz on August 15, 2005.
- ¹⁰⁶ Interview with Edson Ramírez, Director of Mountaineering Guide School in Huaráz on August 5, 2005.
- ¹⁰⁷ Interview with Antonio Marcelino Barreto, coordinator of the San Marcos Pro Environment Commission on August 8, 2005.
- ¹⁰⁸ Plan Maestro del Parque Nacional Huascarán 2003 – 2007. Intendencia de Áreas Naturales Protegidas. Instituto Nacional de Recursos Naturales INRENA. Enero 2003. Pág. 154.
- ¹⁰⁹ Avances de la Gestión 2004 – 2005 del Parque Nacional Huascarán. J.C. Castro. Ancash 2005.
- ¹¹⁰ Interview with Antonio Marcelino Barreto, coordinator of the San Marcos Pro Environment Commission on August 8, 2005.