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**PROPOSAL FOR THE INCLUSION OF THE GUANACO (*Lama guanicoe*)
IN APPENDIX II OF THE CONVENTION***

Summary:

The governments of Bolivia, Chile, Paraguay and Peru have jointly presented the attached proposal for the inclusion of the Guanaco (*Lama guanicoe*) in Appendix II of the CMS.

*The geographical designations employed in this document do not imply the expression of any opinion whatsoever on the part of the CMS Secretariat (or the United Nations Environment Programme) concerning the legal status of any country, territory, or area, or concerning the delimitation of its frontiers or boundaries. The responsibility for the contents of the document rests exclusively with its author

PROPOSAL FOR THE INCLUSION OF THE GUANACO (*Lama guanicoe*) IN APPENDIX II OF THE CONVENTION

A. PROPOSAL

Inclusion of the Guanaco (*Lama guanicoe*) in Appendix II of the CMS

B. PROPONENTS

Peru, Bolivia, Chile and Paraguay

The countries proposing this inclusion in the appendices of the CMS are within the species' range of distribution.

C. SUPPORTING STATEMENT

1. Taxonomy

- 1.1 Class Mammal
- 1.2 Order Artiodactyla
- 1.3 Family Camelidae
- 1.4 Genus *Lama*
- 1.5 Species *Lama guanicoe* (Müller, 1776)

The guanaco is a wild species of South American camelid, and noting Resolution 12.27 (UNEP/CMS), on taxonomy and nomenclature, the standardized reference for land-based mammals adopted is *Mammal Species of the World* (Wilson and Reeder, 2005). In this reference, the only valid species of the genus is *Lama glama* (Linnaeus, 1758), a taxon described based on the domesticated species known as the llama and which has an order of precedence with respect to the later described wild forms, such as the guanaco or vicuña species. However, it recognizes that the International Commission of Zoological Nomenclature (ICZN) must favor the use of species names based on their wild counterparts before domesticated forms (Opinion 2027 of 2003). The taxonomic modifications related to the species of guanaco were carried out by Gentry et al. (2004).

The descriptions of new taxons and other changes made later to the work of Wilson and Reeder (2005) were compiled into a digital database of mammals called the *Mammal Diversity Database* and added more than a thousand species (Burgin et al., 2018). Currently, four species are recognized in the genus *Lama*: the wild species guanaco *Lama guanicoe*, the domesticated species llama *Lama glama*, the wild species vicuña *Lama vicugna*, and the domesticated species alpaca *Lama pacos* (Mammal Diversity Database, 2023).

1.6 Scientific synonyms

Camelus guanicoe Müller, 1776; *Camelus huanacus* Molina, 1782; *Auchenia llama* Waterhouse, 1838; *Lama pacos fera* Gray, 1843; *Auchenia guanacos* Schinz, 1845; *Lama molinaei* Boitard, 1845; *Palaeolama mesolithica* Gervais & Ameghino, 1880; *Auchenia Lönnbergi* Ameghino, 1899; *Lama huanachus cacsilensis* Lönnberg, 1913; *Lama guanicoe voglii* Krumbiegel, 1944.

1.7 Name or common names in all the applicable languages used by the Convention.

English: Guanaco

Spanish: Guanaco, huanaco, chulengo, luan

French: Guanaco

Common names in other ethnicities: Amere (Yamana), luan (Araucano), nau (Tehuelche), wanaku (Quechua), yohn (Ona), chulengo (denomination used for the breeds in Patagonia), teke (raised in the north-east of Argentina).

2. Overview

The guanaco (*Lama guanicoe*) is one of the four South American camelids of the Camelidae family that inhabits the arid and semi-arid regions of South America and is characterized by its social and physiological flexibility in the various regions that it inhabits (Gonzalez et al., 2006). The marked flexibility in the social structuring of these camelids has been the key to its successful colonization and expansion of its range of distribution.

Its distribution is broad, albeit fragmented, from the north of Peru (8°30'S) to the Navarino Island in the south of Chile (55°S), and from the north-east of the Pacific Ocean to the south-east of the Atlantic Ocean, and from sea level up to an altitude of 5,000 meters in the Andes.

The guanaco provides regulatory support and provisioning services due to its role in the trophic network, but also fulfills an important role in its habitat by reducing the dry material liable to catch fire and by spreading seeds through its dung piles, promoting the recycling of nutrients and the colonization of degraded soils (Cortes et al., 2003; Cavieres and Fajardo, 2005).

With respect to its anatomy, its padded hooves reduce the impact on soft soils and its teeth allow vegetation to be cut without pulling it from the soil, thereby preventing damage to pastures and aiding their recovery (Novaro et al., 2000; Henriquez, 2004; Laguna et al., 2015).

It is used as a sentinel species, making it possible to detect environmental variations and monitor changes in soil use, and it is used also as a flagship species for creating natural protected areas (Chehebar et al., 2013).

Furthermore, the guanaco has played an essential role in subsistence since the earliest civilizations in Peruvian territory and forms part of the cultural traditions of the various communities associated with the desert and Andes mountains. It is worth highlighting that the communities referred to use this species for food, clothing and artistic and spiritual development (Miller, 1980). The guanaco forms part of their symbolic beliefs and ancestral indigenous heritage and, as such, its conservation and the equilibrium of the ecosystem are significant concerns for local communities.

Nevertheless, the increase in human activity and a lack of planning have led to a significant reduction in the guanaco population and the isolation of populations in many areas (Ovejero, 2012; Ovejero and Novaro, 2023). The direct threats identified for the guanaco throughout their distribution are the degradation and fragmentation of their habitat, illegal hunting, linear infrastructure and competition with domestic cattle for pastures and water.

The absence of groups residing outside southern Patagonia suggests that these peripheral populations are currently relatively isolated from their original populations and receive occasional wanderers. The relatively low size of these populations (<500 individuals), combined with the effect of isolation may lead to these populations to local extinction.

The inclusion of the species *Lama guanicoe* in Appendix II of the CMS is crucial for the global conservation of the guanaco. It will serve to consolidate individual and regional actions being carried out to reverse this trend and also prevent the disappearance of animal migration as a fundamental biological process for artiodactyls.

This proposal seeks to drive actions to maintain the integrity of large, medium and small populations throughout their distribution range and ensure the connection between cross-border populations for their conservation and revival.

3. Migrations

Migratory ungulates are an essential part of natural ecosystems and account for a large proportion of the prey for the world's carnivores; their migrations also contribute to local and regional economies through crops and tourism and are interwoven in the culture of numerous communities (suggested reading, "Guanacos and People in Patagonia: A Social-Ecological Approach to a Relationship of Conflicts and Opportunities". Natural and Social Sciences of Patagonia, Carmanchahi and Lichtenstein Eds., Springer-2662-3463).

3.1 Types of displacement, distance, cyclical and predictable nature of migration

Data exists that shows the altitudinal and longitudinal migrations of guanacos throughout their distribution. Migration by guanacos is driven by seasonal, spatial and climatic variations and the availability of resources (Raedeke, 1979; Franklin, 1983; and Puig, 1996; Novaro, 2010; Baldi, 2010; Carmanchahi et al., 2014; Moraga et al., 2015; Bolgeri, 2016; Ovejero et al., 2016; Carmanchahi et al., 2019; Novillo et al., 2020; Carmanchahi and Lichtenstein, 2022; Donadio et al., 2022; Gonzalez et al., 2022; Candino et al., 2022; Ovejero, 2023; Ovejero and Novaro, 2023), especially in arid and semiarid ecosystems, where there are extreme variations between seasons. These camelids have to face these changes by modifying the way they select and use their habitat, moving short distances or establishing predictable cyclical movements in search of better-quality resources in greater abundance (Raedeke, 1979; Franklin, 1983; Puig, 1996; Novaro, 2010; Baldi, 2010; Carmanchahi et al., 2014; Moraga et al., 2015; Bolgeri, 2016; Ovejero et al., 2016; Carmanchahi et al., 2019; Novillo et al., 2020; Carmanchahi and Lichtenstein, 2022; Donadio et al., 2022; Gonzalez et al., 2022; Candino et al., 2022; Ovejero, 2023; Ovejero and Novaro, 2023). There are migratory and sedentary populations throughout the guanaco's area of distribution (Franklin et al., 1983; Gonzalez et al., 2006) (suggested reading, "La Migration de Animales Silvestres en el Antropoceno, ¿Que sabemos? ¿que nos falta? y ¿hacia donde caminamos?", Ovejero and Novaro 2023, in press).

3.2 Proportion of the migrant population, and reasons to consider it a significant proportion

Animal migrations, and in particular those of guanacos, are among the most threatened biological processes in the world, and there is a significant risk of losing most of these animal migratory processes, such as those of the guanaco. Currently, less than 10% of the guanaco populations in South America are still migratory.

There are populations that make intra and interjurisdictional movements between Chile and Argentina in the Andes mountains in the region of Atacama and the Province of San Juan (former Pascua-Lama mining project), monitored by satellite collars; in the Andes mountains in the region of Coquimbo and the Province of San Juan (Pelambres mine and El Pachon project, Gonzalez et al., 2007), in the Andes mountains in the Santiago Metropolitan Region and the province of Mendoza (Cruz de Piedra fund and Laguna del Diamante provincial reserve, Gonzalez, pers. obs.) as well as in the Patagonian steppe of the Aysen Region / Chacabuco valley / Patagonia park / Monte zaballos / Lag. Pueyrredon / Magallanes region and the Chilean Antarctic / Karukinka / Isla grande de Tierra del Fuego (areas divided by just a wire), farms on the Isla Grande region known as Pampa Guanacos, between Chile and Peru

(Tacora Volcano / Chupiquiña Volcano), and between Bolivia and Paraguay (there is a protected area in common in the Chaco, where the guanacos cross from one country to the other, Erika Cuellar, pers. comm.; Dario Mandelburger, pers. comm.).

Furthermore, past and current migrations have been reported within the countries (Peru, Bolivia, Argentina, and Chile).

The increase in human activity and a lack of planning have led to a significant decline in the guanaco population and the isolation of populations in many areas (Ovejero, 2012; Ovejero and Novaro, 2023). Monitoring populations and movement patterns plays a critical role in animal ecology and the conservation of biodiversity and detecting changes (due to environmental factors or human activity) occurring in local populations is key for understanding their temporal dynamics and the efficiency of measures implemented (Gibbs, 2000). Direct threats identified to the guanaco throughout its distribution were the degradation and fragmentation of habitats, illegal hunting, linear infrastructure (wire fencing, trails, etc.) and competition with domestic cattle for pastures and water.

The absence of groups living in some anthromes, especially those outside southern Patagonia, suggests that these peripheral populations are currently relatively isolated from their original populations and receive occasional wanderers. The relatively low size of these populations (<500 individuals), combined with the effect of isolation, may lead these populations to local extinction. Therefore, we consider the inclusion of the species *Lama guanicoe* in Appendix II of the CMS to be crucial for global conservation of the guanaco; it will serve to consolidate individual and regional actions being carried out to revert this trend and prevent the disappearance of animal migration as a fundamental biological process in artiodactyla species.

4. Biological data (other than migration)

4.1 Distribution (current and historical)

The guanaco has a broad albeit fragmented range of distribution, from the north of Peru (8°30'S) to the Navarino Island in the south of Chile (55°S), and from the north-east of the Pacific Ocean to the south-east of the Atlantic Ocean, and from sea level up to an altitude of 5,000 meters in the Andes.

However, its distribution has been severely affected by hunting, human occupation, fragmentation of habitats, competition with cattle, and the installation of fences (Torres, 1992; Franklin et al., 1997; Gonzalez et al., 2006), reducing the distribution of guanaco to just 26% of its original distribution (calculated by Ceballos and Ehrlich, 2002; based on Franklin, 1982). It is evident that numerous local populations have been uprooted, thereby leading to a very fragmented distribution in many regions (Housse, 1930; MacDonagh, 1949; Mann et al., 1953; Cunazza et al., 1995; Torres, 1992; Gonzalez et al., 2006; Baigun et al., 2007).

In Peru, the species is distributed on the western slopes of the Andes, and the most southern population of guanacos in South America is found in the Calipuy National Reserve in the county of La Libertad (8°30') (Franklin, 1975; Linares et al., 2010), which is home to the largest population in the country. To the south, populations are distributed up to the county of Tacna, on the border with Chile (17°40'S) (Castillo et al., 2022), and a population has been recorded in the area of Nevado Salcantay in the district of Anta, Cuzco (Wheeler, 2006, Veliz and Hoces, 2007). The guanaco are also distributed altitudinally from sea level, in the county of Ica, up to about 5,000 m.a.s.l. in the counties of Arequipa and Puno. (Castillo et al., 2016)

In Bolivia, a relict population of guanaco persists in the Chaco region (Cuellar and Fuentes, 2000), and recent sightings have been reported in the southern highlands between Potosi and Chuquisaca (Nuñez, 2008). Although Pinaya (1990) reported the presence of guanacos to the south-east of Tarija, these sightings require confirmation. In Bolivia, the estimated population of marshland guanaco is between 150 and 200 individuals, whereas the high Andean population is not yet known (Cuellar, & Nuñez, 2009).

In Paraguay, a small relict population has been reported in northwestern Chaco (Villalba, 2004).

In Chile, guanacos can be found from around the village of Putre on the border in the north with Peru down to Navarino Island in the extreme south in Tierra del Fuego (Gonzalez et al., 2013). The largest guanaco populations in Chile are concentrated in the regions of Magallanes and Aysen in the far south. In the rest of the country, small and fragmented populations of guanacos can be found in the foothills of the Andes in the far north; and small groups dispersed along the coast, the central-northern region in the lower Andes and in the center of Chile, exclusively in the Andes (Gonzalez 2010a; Gonzalez et al., 2013).

Most of the remaining guanacos in the world can be found in Argentina. Although their area of distribution encompasses almost all of Argentine Patagonia, the guanaco populations seem to be more dispersed through the northern provinces of the country (Chubut, Rio Negro, Neuquen and Mendoza) in comparison with the southern region (Santa Cruz and Tierra del Fuego) (Baigun et al., 2007; Wildlife Conservation Society, 2012). Throughout the north of Patagonia, their distribution is very fragmented and consists of relict populations in the provinces of La Pampa and the southwest of Buenos Aires. In central and northern Argentina, the distribution of guanaco is restricted to the western half of the country throughout the lower Andes and Andes mountains up to the border with Bolivia (Baigun et al., 2007). Recently, a relict population was reported in the arid Chaco in the northwest of Cordoba (Schneider et al., unpublished data) and guanacos have been reintroduced in Cordoba.

The subspecies of guanaco have been described according to body size, skin color, and the size and proportions of the cranium (Lönnerberg, 1913; Krumbiegel, 1944). According to morphological assessments carried out by Krumbiegel (1944), four geographical subspecies have been recognized: *Lama guanicoe guanicoe*, *L. guanicoe cacsilensis*, *L. guanicoe voglii* and *L. guanicoe huanacus*. However, according to molecular studies of Cytochrome b mitochondrial DNA carried out by Marin et al. (2006), only two subspecies are supported, *Lama guanicoe guanicoe* and *L. guanicoe cacsilensis*.

The subspecies *Lama guanicoe cacsilensis* (Lönnerberg, 1913) inhabited the southern center of Peru and the far north of Chile, although according to the evidence of Marin et al. (2008), this subspecies has been observed up to the Paposos sector and not just in the foothills of Tarapaca as had been previously suggested (Franklin, 1982; Wheeler, 1995). Indeed, the genetic evidence observed by Marin et al. (2008) shows that the subspecies *L. guanicoe cacsilensis* has adequate genetic diversity, but that there is evidence a populational reduction and quite recent population fragmentation, very possibly as a result of human activity.

In addition, there are records from the second half of the 20th century of the presence of guanacos around Antofagasta and south of Iquique in Chile, where today there are none (Nelson Amado, pers. comm.). The subspecies *L. guanicoe huanacus* (Molina, 1782) is highlighted as being distributed in the northern center of Chile from 22° to 28° or 32° S (Franklin, 1982; Wheeler, 1995; Gonzalez et al., 2006). Nevertheless, considering the results of Marin et al. (2008) the form presently found in Paposos would correspond to *L. guanicoe cacsilensis* and not to *L. guanicoe huanacus*.

Finally, the most abundant and southerly form, *L. guanicoe guanicoe* (Müller, 1776), inhabits an area from 32° S southwards, covering a large part of Patagonia in Argentina and Chile, being found in Chile in Aysen and Magallanes, including the islands of Tierra del Fuego and Navarino (Franklin, 1982; Wheeler, 1995; Sarno et al., 2001, Gonzalez et al., 2006).

4.2 Population (estimates and trends)

Prior to the Spanish conquest, guanaco populations were found throughout an altitudinal gradient, from the coast of the Pacific Ocean up to the Andes mountains, and from the north of Peru down to Tierra del Fuego and Isla Navarino (Cunazza et al., 1995; Wheeler, 1995; Marin et al., 2008). To the east, they were found in the Paraguayan Chaco and throughout the Pampas to the Atlantic coast of Argentina (Torres, 1985; Wheeler, 1995; Marin et al., 2008). The original guanaco population present during this period was estimated at between 30-50 million animals (Raedeke, 1979).

This abundance was drastically reduced as a result of indiscriminate hunting and the commercial raising of sheep, and by the end of the 19th century, the population of guanacos had fallen to 10 million individuals (Cabrera and Yepes, 1940; Torres, 1985; Wheeler, 1995).

The current guanaco population is just over 2 million individuals. The estimated guanaco population in Peru is 3,810, in Bolivia, 150-200, in Paraguay, 20-100, in Chile, 270,000-299,000, and in Argentina there are 1,225,000-1,890,000 (Figure 1).

Although the global population trend is stable, it should be taken into consideration that there are various guanaco populations that are in decline, such as those in Peru, Bolivia, Paraguay, northern Chile, and northern Argentina (IUCN, WCS 2012).

In the mid-1960s, Grimwood (1969) estimated that there were approximately 5,000 guanacos in Peru, leading the Peruvian government to declare it a species under threat of extinction in 1971. Later, Hoces (1992) estimated that there was a population of 1,347 guanacos, based on populational data obtained from the National Reserves of Calipuy, Salinas and Aguada Blanca and Pampa Galeras (area of influence), as well as from the Huaycho cooperative in Puno. In 1996, the first ever national census was carried out, reporting a total of 3,810 guanacos in a total area of 1,724,961 hectares, distributed across 9 counties, 16 provinces and 26 districts (CONACS, 1997). It was highlighted that just four counties had a concentration of 88% of the national population of guanacos.

In 2006, a stochastic projection of the guanaco population was made, estimating that if the hunting rates documented in Arequipa were extended to a national level, the species could become extinct in 30 years (Wheeler et al., 2006). Nevertheless, the increase in certain guanaco populations in recent years, principally those in natural protected areas, as well as the reporting of new populations such as those in Marcona, Torata, Atico, Yarabamba, etc. (which had previously only been known locally) would make it possible to estimate a general population of between 4,000 and 5,000 individuals. However, there are still very small populations (such as in Marcona in Ica and Huaycho in Puno, among others) which are subject to sudden reductions in numbers and liable to local extinction due to the loss of genetic variability, demographic fluctuations, anthropic activity and environmental alterations. (CONACS, 2001; Injante, 2003; Zuñiga, 2004; Castillo et al., 2012).

In Bolivia, guanacos are distributed mainly in the Chaco ecosystem towards the south of the country. They were protected by Supreme Decree No. 11238 of 1973, which prohibits the hunting and capture of this species (Villalba, 1992). The Red Book of Vertebrates of this country categorized the species as "Endangered" due to the reduction and distribution of its populations (Erqueta and de Morales, 1996). Later, the population of the high plateau of Bolivia was reclassified as "Extinct" in (Cuellar Soto and Nuñez, 2009). Recently, this

classification was modified and it is now categorized as "Critically Endangered" due to there being a few individuals making up an isolated relict population, threatened by hunting and the loss of habitat (Cuellar Soto et al., 2017).

Paraguay has a much-reduced population located in and around the Medanos del Chaco National Park, equivalent to the size of the population in Bolivia, with the sharing of the territory in the border area. This population has about 50 individuals and is categorized as "Endangered" (Cartes et al., 2017). Due to the identification of a narrow migratory corridor between the Paraguayan and Bolivian populations, both countries recently signed an agreement to implement common conservation strategies for the species (Cuellar Soto et al., 2017).

Chile has the second largest guanaco population after Argentina. In this country, the species is found in desert environments, xeric scrublands, mountainous areas up to 5,000 masl, Patagonian steppe and in sub-polar woodlands (Gonzalez et al., 2013). Populations in the far north of Chile correspond to *Lama guanicoe cacsilensis*, and those in the south to *L. guanicoe guanicoe*, whereas in the center of the country, a region of contact between *L. guanicoe cacsilensis* and *L. guanicoe guanicoe* has been identified (Marin et al., 2013). The conservation status of the guanaco in Chile varies according to its abundance. Whilst in the north, central and southern parts of the country they are categorized as "Vulnerable", in the far south they are categorized as "Least Concern", with some populations in this area being managed for productive purposes (Supreme Decree No. 33/2011-MMA, Gonzalez et al., 2020). The estimated population oscillates between approximately 270,000 and 290,000 individuals, with an upward trend, influenced by the abundance of the populations in the far south, which accounts for more than 80% of the national total (Gonzalez and Acebes, 2016).

Argentina has the largest population of guanacos, which are located principally in Patagonia, mostly in the provinces of Chubut, Santa Cruz, Tierra del Fuego and in the south of Mendoza. However, there are various fragmented populations of low or very low density in some parts of Chubut, Rio Negro and Neuquen (two to five guanacos/km²) (Cunazza et al., 1995; Puig et al., 1997; Puig et al., 2003; Baldi et al., 2001; Schroeder et al., 2014). The populations with low densities are found in the provinces of Catamarca, Tucuman, La Rioja, San Juan and in the north of Mendoza. In the rest of Argentina, densities are lower than one guanaco/km². Some relict populations have been found in the provinces of La Pampa, Cordoba and Buenos Aires (Carmanchahi et al., 2019). Given the guanaco's extended presence, the species is classified as of "Least Concern" at the national level. Nevertheless, this categorization must be taken with caution as, even though the populational trend in Patagonia has been growing over the last decade, the populations in Puna and peri-Puna, Chaco, La Pampa and Buenos Aires are "Endangered" or "Critically Endangered" (Gonzalez and Acebes, 2016; Carmanchahi et al., 2019). There, it is crucial to evaluate the conservation status at the regional or subregional level.

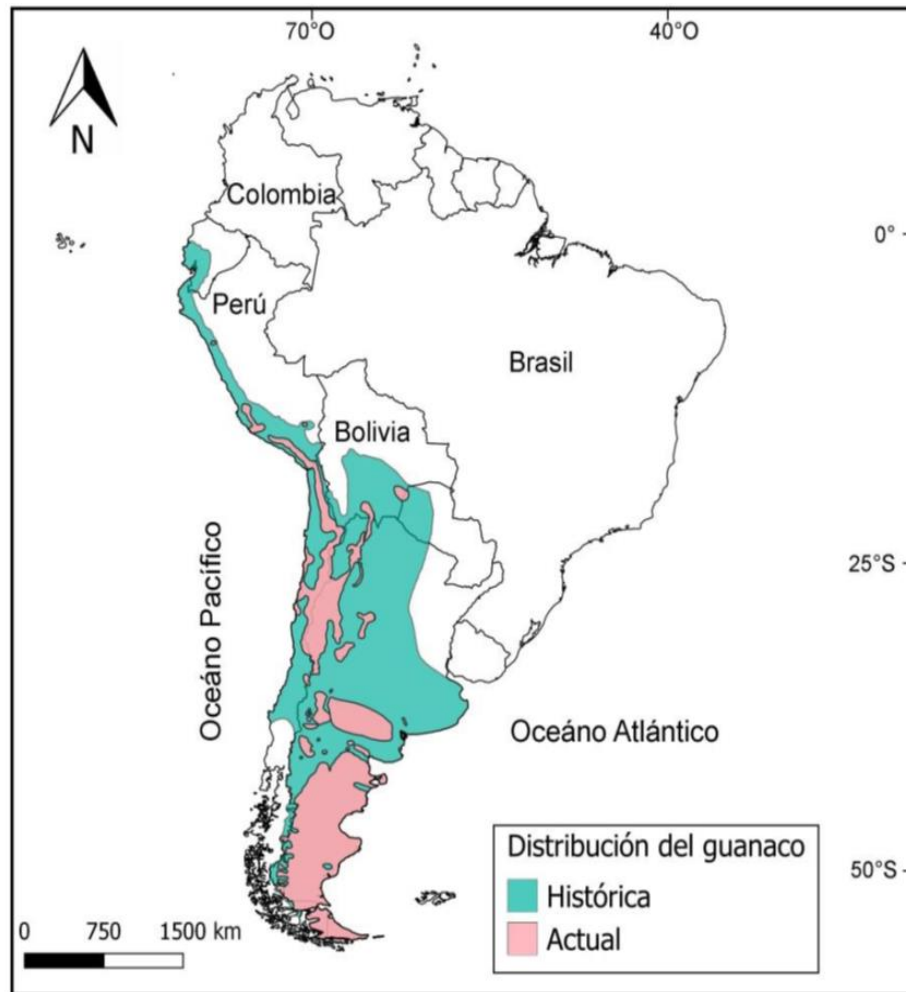


Figure 1. Range of Geographical Distribution of Guanaco (Modified from Franklin 1982, Cunazza *et al.*, 1995, Wheeler 1995), historical distribution (turquoise) and current distribution (pink)

4.3 Habitat (brief description and trends)

The habitat of the guanaco is characterized by seasonal climates, including dry winters, snow, low temperatures and moderate or high intensity winds, low rainfall combined with high evapotranspiration creating arid conditions that result in low vegetation cover.

Patagonia has four of the ten main habitats described for South America: desert and xeric scrubland; grasslands or mountainous prairie; prairies, savannah and scrub; and temperate forests (IUCN, 2006).

4.4 Biological characteristics

The guanaco is the largest ungulate in South America, measuring 110 cm tall at the shoulders, with a length from nose to tail of 210 cm, and a weight of 120-130 kg. They have cinnamon-brown colored fur on the upper body and white fur covering their neck and lower body. Their heads are narrow with wide pointed ears, their lips have a central cleft, and they are highly mobile (Cuellar and Nuñez, 2009).

The guanaco can live in a wide variety of environments, from sea level up to 5,000 meters in altitude, adapting to very different ecoregions (Puna, Altos Andes, Monte de Llanuras y Mesetas, Monte de Sierras y Bolsones, Patagonian steppe, Patagonian woods, Chaco Seco,

Espinal, Pampa, Serrania steppe and coastal hills), with contrasting topographic (plateaus, valleys, plains, grassy plains and slopes), physiognomic (steppes, grasslands, shrubs and woods) and climactic characteristics (Gonzalez et al., 2006; Vila, 2012). This ability to adapt and its successful colonization is due to its eco-physiological and behavioral adaptations to diverse environments with extreme conditions, in particular the special adaptation to high temperatures and dehydration (Rosenmann & Morrison, 1963; Gonzalez et al., 2006).

The guanacos are generalist herbivores with intermediate selectivity, able to alternate between foraging behavior, grazing and browsing according to the availability of food (Puig et al., 2001; Baldi et al., 2004). Their food is varied and includes fungus, lichens, ferns, herbs, leaves, shrubs, trees and cactus (Raedeke and Simonetti, 1988; Gonzalez et al., 2000; Cortes et al., 2003; Muñoz, 2008). They are occasional drinkers and have special physiological mechanisms for dealing with the scarcity of water (Rosenmann & Morrison, 1963; Fowler, 2010).

The guanacos live in groups throughout the year, which are clearly defined during the breeding season (Franklin, 1983; Ortega and Franklin, 1995). The following social units can be differentiated in the vast majority of populational nuclei:

- Single males: reproductively mature adult individuals, with no defined territory or strictly territorial exercising active defense of the territory. They do not associate with other individuals, whether male or female.
- Family groups: consisting of an adult male, his harem of females (up to 15), the young of the year and juveniles of up to 15 months in age. These groups are larger in the summer and smaller in winter. The adult females enter or leave the group flexibly and without interference from the male. In these sedentary populations, these groupings are markedly territorial, corresponding to the territory of the male.
- Groups of single males: these are groupings of non-reproducing and non-territorial immature males. In sedentary populations, these are geographically and socially separate from the family groups, having defined areas for each group throughout the year. In sedentary populations, segregation occurs during the spring, summer and fall months. The size of the group varies and may be a few males up to groupings of more than 50 individuals.
- Mixed groups: these are groups of males and females of all ages, mainly observed in migratory populations. These groupings can be found mostly during the fall and the winter. The size of the group can vary and may be between 15 and up to a hundred animals.
- Groups of females: consisting of groups of females with or without their young of the year.

The social structure of these camelids is highly flexible and may vary between populations depending on the environmental conditions and the quality of the territory they inhabit (Franklin, 1983; Puig and Videla, 1995). Up to this point, the influence of human activities is unknown (extractive: oil drilling, mining; recreational: tourism, hunting; farming: cattle, presence of cables, etc.) on the sociability of the guanaco and of wild camelids in general.

As mentioned before, guanaco populations can be sedentary (Raedeke, 1979; Franklin, 1983), or migratory (Franklin, 1983; Bolgeri, 2016), depending on the environmental and climactic conditions. In some populations, family groups have been described both without males and in mixed groups (Franklin, 1982). In the Torres del Paine National Park (Young and Franklin, 2004a) and the La Payunia Provincial Reserve (Ovejero, pers. comm.) groups of females have been observed with their young moving between the territories of the males during the breeding season.

4.5 Role of the taxon in its ecosystem

The importance of guanaco is based on a set of multiple values, including their potential to provide regulating support and provisioning services, and for their role in the trophic network. Furthermore, the species plays an important role in its habitat by reducing dry matter liable to catch fire and spreading seeds in its dung piles, promoting the recycling of nutrients and colonization of degraded soils (Cortes et al., 2003; Cavieres and Fajardo, 2005).

Given their anatomy, with padded hooves, they have a reduced impact on soft soils compared with domestic cattle with cleft hooves, and their teeth allow them to cut vegetation without pulling it from the soil, thereby not causing damage to the pastures and allowing them to recover (Novaro et al., 2000; Henriquez, 2004; Laguna et al., 2015).

It is used as a sentinel species, making it possible to detect environmental variations and monitor changes in soil use. It has also been successfully used as a flagship in the creation of natural protected areas (Chehebar et al., 2013).

In addition, both the guanaco and the vicuña have been essential in subsistence since the earliest civilizations in Peruvian territory and are part of the cultural traditions of the different communities associated with the desert and the Andes mountains. It is worth highlighting that the communities referred to use this species for food, clothing and artistic and spiritual development (Miller, 1980). The guanaco forms part of their symbolic beliefs and ancestral indigenous heritage and, as such, its conservation and the equilibrium of the ecosystem are significant concerns for local communities.

4.6 Use, selection, current habitat status and functional role of the species

The wild South American camelids are conditioned by seasonal, spatial and climatic variations and the availability of resources (Raedeke, 1979; Franklin, 1983; Puig, 1996; 1997; Contreras et al., 2006; González et al., 2006; Puig et al., 2008; Acebes et al., 2010; Ovejero et al., 2011), especially in arid and semi-arid ecosystems, where variations are extreme (Dinerstein et al., 1995; Morello, 1958). These camelids have to face these changes by modifying the way they select and use their habitat, moving short distances or migrating in search of better-quality resources in greater abundance (Owen-Smith, 2002).

The geographical distribution of the guanaco includes four of the 10 principal habitats categorized for South America: a) deserts and xeric scrubland, b) High shrubland and grasslands, c) Grassy and shrub savannahs, d) Temperate woodlands (Dinerstein et al., 1995; see description in Gonzalez, 2006).

Currently, the largest population of guanacos is concentrated in Argentinian Patagonia (Wheeler, 1991; Puig, 1995). The Patagonian steppes and semi-desert occupy the largest part of the vast flat plains, plateaus and mountain ranges in the extreme south of the American continent. They cover an area of more than 800,000 km² and account for the only temperate grass and scrubland in South America. From the northeast, in a broad ecotone, the region borders the Phytogeographic Province of Monte, and to the west, the steppes border with the subantarctic woodland (Paruelo et al., in press). In general, these camelids show preferences for open and flat areas (Cajal, 1989; Raedeke, 1982; Puig et al., 2008), where the risk of predation is lower (Marino and Baldi, 2008), and where there is good availability of food, particularly the species preferred by the guanaco (Puig et al., 2008). The guanaco populations in the center and north of Patagonia choose habitats with a good availability of preferred forage species (*Panicum urvilleanum*, *Poa lanuginosa*) over those habitats with a greater abundance in forage species that they tend not to consume (*Stipa* spp., *Schinus* spp., *S. filaginoides*, *M. spinosum*). Furthermore, the abiotic or physical characteristics of a potential habitat, such as the type of substrate, slope, distance to water sources, and the vertical stratification of the

vegetation (physiognomy) also influence the way guanacos choose their habitat (Puig et al., 2008).

Historically, guanacos have been the dominant ungulates in South America, but currently there is less than 15% of the original population prior to European colonization and there has been a reduction of 60% in the range of their distribution (Baldi *et al.* 2010). Currently, populations are highly fragmented and protected areas are too small to contain large populations (Baldi et al., 2010). Due to the lack of planning with respect to human activities, there has been a continuous reduction in distribution and populational size, and the remaining populations have been relegated to marginal sites of low quality (Baldi et al., 2010). The mass introduction of cattle at the end of the 19th century resulted in an extended process of overgrazing due to the excess animal load, which aggravated the desertification process (it is estimated that 30% of the region is undergoing severe desertification; del Valle, 1998) and may lead to irreversible changes when this is severe (Bisigato and Bertiller, 1997). Another problem is that 95% of arid Argentinian Patagonia consists of private land with electric fencing. This is a factor in the alteration of habitats, causing between 15 and 20% of deaths in young guanaco (Baldi et al., 2004), in these areas. In general, guanacos are not tolerated as they are potential competitors to domestic cattle. In its turn, illegal hunting throughout its area of distribution was the principal cause for population decline in the 1970s (Baldi et al., 2010). Oil and gas exploration and exploitation have caused changes to the landscape, such as the construction of roads which facilitate access and the expansion of illegal hunting (Radovani, 2004, 2009). The fragmentation of the landscape has led to the isolation of current populations and puts the continuation of populations and their functional role in the ecosystem at risk (Novaro et al., 2000). Human activities have caused a loss of habitats and function as a barrier for movement between the guanaco populations (Baldi et al., 2010).

Throughout their distribution area, guanacos are essential for maintaining the functionality of the ecosystem, controlling its growth and the composition of vegetation cover (Fuentes and Muñoz, 1995). Similarly, the excrement or manure of these camelids act as a seed bank and are important sources of nitrogen, phosphorous and organic matter, providing a favorable substrate for the germination and establishment of plant species in those habitats with impoverished soils (Henriquez, 2004). Furthermore, these camelids constitute a fundamental food for feline and canine species distributed throughout the Andes mountains and southern Patagonia (Texera, 1973; Wilson, 1984; Franklin and Johnson, 1991; Bank and Franklin, 1998; Cajal and Lopez, 1998; Franklin et al., 1999; Bank et al., 2002; Johnson Franklin, 1994).

5. Conservation status and threats

5.1 IUCN Red List Assessment

The status of the species is considered of "Least Concern" due to its wide continental distribution (around 1,000,000 km²), its alleged total population size (around one million adults) and the presence of numerous protected areas throughout its distribution (56 protected areas covering around 146,000 km²). However, the real guanaco conservation measures continue to mainly respond to recurrent emergencies, in particular, severe local poaching, and this does not address the more significant holistic threats facing the species. This is the result of their current wide distribution in small-fragmented and isolated populations, in contrast to some abundant populations distributed locally and more broadly.

Of grave concern regionally is the very probable extinction of the guanacos in three of the five countries where they have been found historically and are currently classified as "Endangered", which are Paraguay, Bolivia and Peru. For this reason, it is important to emphasize that the future management of guanaco should not just deal with the problem of poaching but focus on the implementation of measures to protect and conserve these reduced

populations, as well as simultaneously broadening the sustained use of these recovered and abundant populations to the benefit of local residents and landowners.

As a consequence, a more precise global classification of the guanaco is required as a species in itself, which more accurately reflects the heterogeneity of the subpopulations in their multinational regional distribution.

Current conservation categories in each proponent country:

Country - Peru

Category - CR (Critically Endangered)

Year - 2014

Source - Supreme Decree No. 004-2014-MINAGRI

Country - Bolivia

Category - CR (Critically Endangered)

Year - 2008

Source - Tarifa and Aguirre (2009)

Country - Paraguay

Category - EN (Endangered)

Year - 2017

Source - Saldivar et al. (2017)

Country - Chile

Category - LC (Least Concern)

Year - 2011

Source - From the Region of Aysen to the Region of Magallanes (DS 33/2011 MMA

Country - Chile)

Category - VU (Vulnerable)

Year - 2011

Source - From the Region of Arica and Parinacota to the Region of Los Lagos (DS 33/2011 MMA)

5.2 Equivalent information concerning the evaluation of conservation status

While there has been a drastic reduction in the guanaco population in Argentina, estimated at between 90 and 97% since European colonization, the trend over the last 30 years has increased (Gonzalez & Acebes 2016). Currently, the estimated total population for Argentina is just under one million guanacos (Gonzalez & Acebes 2016) and their broad distribution area suggests that the species on a national level should be categorized as Least Concern (LC). However, this categorization should be taken with caution. While populations in Patagonia have increased over the last decade, those in the central-west and north of the country are now reduced, fragmented and isolated populations. Therefore, it is necessary to assess their conservation status at a regional level.

In Bolivia, the guanaco are categorized as Critically Endangered due loss of habitat, competition for the use of space with domestic cattle, hunting, and the installation of fencing that impedes these animals from being able to move from one place to another. The estimated guanaco population in the Chaco is between 150 and 200 individuals, whereas the population in the high Andes is still unknown (Cuellar, & Nuñez, 2009).

In Bolivia, the guanaco have historically been recorded in the high Andean and Puna regions (in the departments of Potosi and Chuquisaca) and Chaco plains (Tarija and Santa Cruz) (Cunazza et al. 1995, Tarifa 1996). The latest report concerning the conservation status of fauna in Bolivia indicated that the guanaco of the high Andes and Puna region would be extinct in the wild (Bernal & Silva 2003, Cuellar & Roberts undated). This assessment was made based on a lack of observations by researchers of the species in the field over the last 18 years.

Alzerreca (1982) recorded the species in the region of Mochara (on the border between the departments of Potosi and Chuquisaca) and Pinaya (1990) to the west of the Sama mountains (in the department of Tarija) (Villalba 1992). This information was corroborated during a workshop between specialists, held in 2001 (Flores & Miranda 2003). In recent years, the only direct observations of guanaco in the wild in Bolivia have been made in the Chaco region, to the southeast of the department of Santa Cruz on the border with Paraguay (Cuellar & Fuentes 2000).

In Chile, the guanaco have two conservation categories depending on whether they are found to the north or to the south of the Los Lagos Region. The guanacos in the northern regions are categorized as "Vulnerable" and those in Aysen and Magallanes are categorized as "Least Concern". According to Glade (1988), in the "Red List of Chilean Terrestrial Vertebrates", the guanaco are categorized as Vulnerable at the national level, but if considered at the sector level, one could say that those in the Metropolitan region are in danger of extinction. Furthermore, the regulation of Hunting Law No. 19.473 classifies the guanaco according to administrative areas, with those in the north, center and south being categorized as In Danger of Extinction and those in the far south being categorized as Vulnerable. Finally, the regulation of Classification of Species catalogs the species between the region of Arica and Parinacota through to the region of Los Lagos as Vulnerable, and those in the regions of Aysen and Magallanes as Not Endangered.

The guanaco's range of distribution throughout the Andes before the arrival of the Spanish has been defined as from the region of Arica and Parinacota to the region of Magallanes. Today, their distribution is considered to be fragmented, with areas where they are extinct and areas where there are large populations, found in the Region of Magallanes, especially on the Island of Tierra del Fuego and in the National Park of Torres del Paine and neighboring areas. Other significant populations can be found in the regions of Tarapaca and Aysen (Cunazza, 1991, Marin 2008).

In Peru, the guanaco have been categorized as "In Critical Danger of Extinction" (DS No. 004-2014-MINAGRI), and their hunting has been prohibited by Law No. 26496 (Law on property, commercialization, and sanctions concerning the hunting of the species of vicuña, guanaco, and their hybrids). Their populations are mainly located in the mountainous steppe and are described as being small, relict populations, with the scarce numbers at altitude and on the coast facing the greatest risk of extinction.

In Paraguay, they can be found in the far northwest of the western region of Paraguay, in the Medanos del Chaco National Park and the Indigenous Reserve Ñu Guazu, between the Departments of Boqueron and Alto Paraguay. There is a population estimated at just 50-100 individuals at the local level, where the guanaco are categorized as In Critical Danger of Extinction, according to the Libro Rojo de los Mamíferos en Paraguay. They play an important economic, social and cultural role for the value of their skin. The Xerophytic-Sub Desert Savanna is the only habitat for the guanaco and the *Arachis burkartii* Handro (SEAM). They can be found in the far northwest of the western region of Paraguay, in the Medanos del Chaco National Park and the Indigenous Reserve Ñu Guazu, between the Departments of Boqueron and Alto Paraguay. It is categorized as "In Danger of Extinction" under Resolution MADES 632/2017, which updates the list of protected mammalian wildlife species. The national

categorization as "In Danger of Extinction" in Paraguay is equivalent to the IUCN categories of "Endangered (EN)" and "Critically Endangered (CR)". With this update, their national status gives them protection under the environmental offenses law. Law 716/1996, which sanctions environmental offenses, uses imprisonment and fines against threats such as destruction, trafficking, commerce and infraction concerning the rules on the hunting of species listed as in danger of extinction. According to Law 96/1992, on wildlife, all possession, hunting and exploitation of any animal species is regulated at the national level and requires express permission from the Application Authority. Furthermore, the species is categorized in Appendix II of CITES, to which Paraguay has been a signatory since 1976, and by which its commerce is regulated under this Convention.

5.3 Threats to the population (factors, intensity)

Guanacos continue to be numerous and are widely distributed in the south of their range. However, their population is continuing to decline in Peru, Bolivia, Paraguay and important parts of Chile. Excessive hunting, degradation of their area of distribution caused by excessive grazing and interspecies competition for forage has played an important and prolonged role in the disappearance of the guanaco throughout their area of distribution (Raedeke, 1979; Franklin, 1982; Miller et al., 1983; Cunazza et al., 1995; Cuellar and Fuentes, 2000; Puig et al., 2001; Baldi et al., 2001; Baldi et al., 2004; Carmanchahi et al., 2022a; Lichtenstein et al., 2022). Currently, the main threats continue to be generalized, but mining and energy projects are also becoming a factor to take into account. Of particular concern is the recent and rapid non-conventional exploration for oil and gas in large areas where the guanaco is distributed.

In Peru, guanacos have been seriously affected by sports and subsistence hunting. The degradation of the habitat due to extraction industries and overgrazing by cattle have been identified as the principal threats to the few remaining subpopulations (Wildlife Conservation Society, 2012).

In Bolivia, the main threat is currently the loss of habitat due to overgrazing by cattle. Despite sports hunting being interrupted in 2001 (Cuellar, unpublished dates), regular poaching continues.

In Chile and Argentina, recreational hunting and poaching are the main threats.

Regardless of population size, persistent illegal hunting is one of the historical threats to the species and is significantly affecting small and low-density populations (Gonzalez, 2010a; Wildlife Conservation Society, 2012). The continuous hunting of numerically recovered populations (Lambertucci and Speziale, 2011) due to antagonism against the species by cattle and landowners that have pressured governments to control guanaco numbers is also an important threat, with examples of this situation occurring in Patagonia both in Chile and Argentina, and populations in the Andes of Central Chile.

In the north of Chile, at the local level, feral dogs are reducing guanaco populations both within and outside the protected areas, and the hybridism with llamas is frequent in areas where there is a low density of guanacos.

Health studies carried out in continental Patagonia have demonstrated that guanaco populations are relatively disease free, but they are susceptible to common domestic ovine, bovine and equine diseases (Karesh et al., 1998; Beldomenico et al., 2003; Uhart et al., unpublished data). Castillo (2006) reaches a similar conclusion based on parasite load studies in Peruvian guanacos raised in the wild. Recently, scabies has been reported as affecting guanacos in the north of Chile, causing mortality in low-density populations. This is also a common disease in guanacos inhabiting Tierra del Fuego, Chile (Skewes, pers. comm.).

5.4 Threats connected especially with migrations

Human activities such as hunting, mining, oil exploration and extraction, cattle fencing, the construction of infrastructure and the loss of habitat, often impose barriers to migration and movement between populations. The loss of connectivity has resulted in small, closed and isolated populations under a growing risk of collapse due to the loss of genetic variation and environmental or demographic stochasticity, with the latter being very significant for excessively small populations. However, recent research in a small insular population of guanacos indicate that such isolation may not be the problem of loss of genetic diversity in the short term (70 years) as had been foreseen previously, but the long-term consequences are inevitable (Gonzalez et al., 2014).

Mining and oil extraction, along with the solar and wind farms, have expanded with the demand for greater production, which has led to a loss of habitat and the fragmentation of the populations in both countries. Furthermore, in the north of Chile and in Argentinian Patagonia, the construction of infrastructure projects has caused the death of guanacos on roads and led to them becoming trapped in the barriers that border the highways, causing local isolation and limiting the movements of the population (Rey et al. 2012).

Due to the lack of planning with respect to human activities, there has been a continuous reduction in distribution and populational size, and the remaining populations have been relegated to marginal sites of low quality (Baldi et al., 2010). The mass introduction of cattle at the end of the 19th century resulted in an extended process of overgrazing due to the excess animal load, which aggravated the desertification process (del Valle, 1998) and may lead to irreversible changes when this is severe (Bisigato and Bertiller, 1997). Another problem is that 95% of arid Argentinian Patagonia consists of private land with electric fencing, further altering habitats and causing between 50 and 60% of deaths in young guanacos (Baldi et al., 2004). The presence of wire fencing is a factor that limits daily and seasonal migratory movements (Carmanchahi et al., 2022a). In addition, illegal hunting in the 1970s was the main cause for population decline throughout its range of distribution (Baldi et al., 2010; Carmanchahi et al., 2022b). Oil and gas exploration and exploitation are the main activities causing changes to the landscape, such as the construction of roads for oil use that also facilitate the arrival and expansion of illegal hunting (Radovani, 2004; Radovani, 2009; Carmanchahi et al., 2022a). The fragmentation of the landscape has led to the isolation of current populations and puts the continuation of populations and their functional role in the ecosystem at risk (Novaro et al., 2000).

Lastly, in Chile and Argentina, where the numbers have recovered due to government-backed management programs and guanaco populations coexist with cattle and forestry practices, there has been a return of public resentment towards the guanaco as observed historically. If guanaco numbers are to be protected, there is a need for sustained programs to use guanacos in ways that benefit the local economy and reduce the number of populations.

5.5 National and international utilization

Guanacos have played a crucial role in the aboriginal hunter-gatherer economy (Tehuelches, Mapuche, Onas, Yamana) of inhabitants in Argentinian territory (Fernandez and Stecher, 2022). Evidence of their hunting throughout at least the last 10,000 years has been verified at archeological sites, and therefore, the species was certainly one of the most important sources of food for the agro-pastoral groups between 3,000 and 1,000 years ago. (Fernandez and Stecher, 2022).

Currently, the guanaco constitute an alternative resource for rural villagers through the management of wild individuals, through enclosure, shearing and liberation or by raising in captivity for the shearing of live animals (Carmanchahi et al., 2022b).

The live shearing of captured guanacos is currently being implemented in Patagonia using funds from the Argentinian government. If properly managed, these programs may offer an alternative for local economies and the reassessment of landowners' negative attitudes towards the species (Franklin et al., 1997; Lichtenstein and Carmanchahi, 2012; Lichtenstein, 2013). More than 11,000 guanacos were sheared between 2004-2008. However, only a very small percentage of the total population of guanaco currently fall under this program (Lichtenstein, 2013). The effects of the sustained use of fibers is being evaluated and monitored, especially where the guanacos are concentrated in dispersed, high-density populations (Ovejero et al., 2013; Carmanchahi et al., 2015). To encourage the commercialization of guanaco products, Argentina is developing and promoting the thread made from guanaco fur.

Guanacos have been hunted legally in Chile since 2003, and there is pressure for a similar arrangement in Argentinian Patagonia in order to reduce their density and conflicts with cattle and forestry production; the hunting of guanacos as approved and organized by the government has resulted in the exporting of meat, contributing to a greater value being given to the species and reducing the traditional conflict with sheep farmers and foresters. It is worth highlighting, however, that a recent study showed that the hunting of adult guanacos in itself did not reduce the damage to the regeneration of *Nothofagus* trees in Tierra del Fuego, Chile (Martinez-Pastur et al., 2016).

It was recently named an Argentinian icon, and it was included in the strategic lines of the National Science, Technology and Innovation Plan for 2012-2015, as a species to be protected as part of plans for the use of non-conventional resources ("Development of a productive model for the improvement in quality of life of small rural producers, based on the sustainable use of guanacos and the application of technological innovations" <http://www.conicet.gov.ar/bra-de-guanaco-una-herramienta-de-desarrollo-social-y-tecnologicosustentable/> ; <https://panorama.solutions/en/solution/wildlife-friendly-patagonian-fiber-building-capacity-sustainability-guanaco-use>).

6. Protection status and species management

6.1 National protection status

In Peru, in accordance with Supreme Decree No. 004-2014-MINAGRI, approving the amendment of the classification and categorization list of threatened legally protected wildlife species, it is categorized as "Critically Endangered (CR)". According to the last census carried out in 1996, Peru had a population of 3,810 individuals in the following departments: Ayacucho: 1,167, Arequipa: 1,124, La Libertad: 538, Ica: 516, Huancavelica: 211, Tacna: 95, Moquegua: 79, Puno: 71 and Apurimac: 9.

6.2 International protection status

Internationally, the guanaco are in the Low Risk category (LR.lc) (IUCN 1996). Given the little data there is on the size of its populations and the quality of its habitats, it is known that approximately 91% of the total population is in Argentina, where they are not considered to be endangered, 9% in Chile where they are considered Vulnerable, in Bolivia <0.02%, Paraguay <0.01%, and in Peru <0.5%, where these populations are considered Endangered (EN) (Gonzalez et al. 2006).

- Paraguay: EN (Endangered) 2017
- Bolivia: CR (Critically Endangered) 2008

- Chile: LC (Least Concern) 201. From the Region of Aysen to the Region of Magallanes, VU (Vulnerable) 2011. From the Region of Arica and Parinacota to the Region of Los Lagos

Included since 1978 in Appendix II of CITES

https://speciesplus.net/#/taxon_concepts/10716/legal

6.3 Management measures

Action plans and/or conservation projects or current measures:

Bolivia:

Development of a productive model for the improvement in quality of life for small rural producers, based on the sustainable use of guanacos and the appropriation of technological innovations”, which is to be carried out by the Payun Matru Agricultural Cooperative for provision, transformation and commercialization, the National Scientific and Technical Research Council (CONICET), the National Industrial Technology Institute (INTI) and the Municipality of Malargüe. Technical Direction Dr. Pablo Carmanchahi. GIEFAS-INIBIOMA-CONICET.

Development, Implementation and Monitoring of Activities for the Exploitation of Wild Guanaco Fiber in Santa Cruz. Provincial Agrarian Council, National University of Southern Patagonia, CONICET. Technical Direction Dr. Pablo Carmanchahi. GIEFAS-INIBIOMA- CONICET.

Argentina:

Quebrada del Condorito National Park Management Plan. National Parks Administration.

Pilot project for the Reintroduction of Guanaco (*Lama guanicoe*) in the Quebrada del Condorito National Park (Cordoba, Argentina).

<https://panorama.solutions/en/solution/wildlife-friendly-patagonian-fiber-building-capacity-sustainability-guanaco-use>

<https://www.cms.int/en/gium>

Current law in Argentina:

National Law No. 22.421/81 Wildlife Protection and Conservation.

Resolution SGAYDS No. 243/2019 National Plan for the Sustainable Management of Guanaco.

Provincial Decree No. 32/2015 Provincial Management Plan of Guanaco - Santa Cruz.

Min. Resolution Production No. 131/2012 Provincial Guanaco Management Plan - Chubut.

Provincial Decree No. 110/2007 Inclusion of the province of Mendoza in the PNMG - Mendoza.

Provincial Law No. 101/1993. Province of Tierra del Fuego, Antarctic and South Atlantic Islands.

Peru:

Guanaco Project 1: Genetic diversity and management implications for Andean guanaco population in Peru / First Workshop on Guanaco Population and Habitat Feasibility Analysis (PHVA) (2003 – 2006).

First meeting for the creation of the National Guanaco Conservation Plan (2021).

Sustainable management of the guanaco: Protection and conservation of guanaco habitat in the Rural Community of Susapaya, Tacna (2019-2021).

6.4 Habitat conservation

Protected Natural Areas (PNA) in the world consist of National Reserve Areas, which are set aside for research, protection or management purposes, controlling their ecosystems, resources and natural richness and involving both natural and cultural components.

Peru:

In the state policy framework, which established the National System of Natural Areas Protected by the State - SINANPE, overseen by the National Service for Natural Areas Protected by the State - SERNANP, under the Ministry of the Environment.

In Peru there are three protected areas where guanacos are distributed: The Calipuy National Reserve, the Salinas and Aguada Blanca National Reserve, and the areas surrounding the Pampa Galeras National Reserve. The Calipuy National Reserve is one of the reserves with the highest population density of the species in Peru, which extends over 64,000 ha., located in the department of La Libertad and whose principal objectives are to conserve and protect the last relicts of the wild populations of "guanacos", *Lama guanicoe cacsilensis*, as well as its associated wild flora and fauna; to provide the means and opportunities for educational activities, the carrying out of scientific research and the monitoring of the status of the environment; and to provide the means and opportunities for recreation and leisure in the open air, as well as the development of ecotourism (SERNANP, 2010).

It is estimated that approximately one third of Peru's guanacos are located in protected natural areas such as the Calipuy National Reserve, in the department of La Libertad, which hosts all of the department's guanacos (more than 1,500 individuals according to the last census, carried out in 2019) and the Salinas and Aguada Blanca National Reserve, in the department of Arequipa, which is home to around 15% of the department's total population. Therefore, the San Fernando National Reserve protects a small but very particular population which inhabits the coastal hillsides of the district of Marcona, Nasca province, in the department of Ica. The presence of guanacos has been reported in the buffer area of the Sub-basin Landscape Reserve of Cotahuasi, in the department of Arequipa.

Bolivia:

The guanaco's situation in the Bolivian Chaco has been the subject of various investigations, as well as conservation actions which we will describe later on in this work. These studies were carried out within the institutional framework set up by the Wildlife Conservation Society, WCS, and the local Isoseño-Guarani organization, La Capitania del Alto and Bajo Isoso (CABI), between 2000 and 2009 through a specific program for this species. Since then, the Kaa-lyá del Gran Chaco National Park and Integrated Management Natural Area (PNKI) has continued with the program to monitor and protect the species. In parallel, strong partnerships have been established with local actors who currently promote the conservation of the guanaco and the management of their habitat through the establishment of reserves. The results with respect to knowledge about the species and its conservation have been significantly facilitated by the participation of parabiologists and park rangers from the Gran Chaco who have set up the various study teams about the species.

As a response to the expansion of agricultural cattle, the Bolivian government set up one of the largest protected areas in South America. Covering 3,440 km², the Kaa-lyá del Gran Chaco National Park and Integrated Management Natural Area (PNKI) covers the largest extension of protected dry tropical woodland (Taber, et al., 1997). For more than a decade, the PNKI has been under the administration of the local Isoseño-Guarani organization, La Capitania del Alto and Bajo Isoso. This model of governance put into practice community-based conservation measures, particularly through the participation of indigenous hunters

(Noss et al., 2003) and other members of the community trained as parabiologists (Cuellar & Noss 2014).

Chile:

The guanaco is present in three National Parks in the Region of Atacama: Llanos de Challes, Nevado de Tres Cruces and Pan de Azucar, where the species is one of the main subjects of conservation, the populations are monitored and the fluctuation in guanaco numbers in each protected area is determined through a biennial census. With the data delivered in each census, it is possible to observe any issues, the effect of conservation actions, and any environmental variables that may impact the guanaco populations in each unit. As a result, one of the country's most iconic reserves is the Torres del Paine National Park, which is located in the Region of Magallanes and the Chilean Antarctic, in the Torres del Payne commune in the province of Última Esperanza. It was set up by Supreme Decree No. 383 of the Ministry of Agriculture, on May 13, 1959. It is known worldwide for the massive stones that give it its name; giant granite rocks formed by the force of glacial ice. In 1978 it was declared a Biosphere Reserve by the Man and Biosphere Program (MAB) by UNESCO and is highlighted for the protection of the species of fauna, including the guanaco.

6.5 Population monitoring

In Bolivia, through Administrative Resolution VMABCCGDF No. 003/23 dated 01.12.2023, the protection and conservation of the Guanaco was declared (*Lama guanicoe cacsilensis*) to genetically preserve the species considering it was in critical danger of extinction. Thus, the Vice-minister of the Environment, Biodiversity Management and Forestry Development through the Directorate-General of Biodiversity and Protected Areas is required to perform all the actions necessary to manage the resources for the elaboration of the Guanaco Conservation Plan and its implementation.

In 2021 in Peru, the first workshop was held, called: "First meeting for the elaboration of the National Guanaco Conservation Plan", which had the objective of drafting a diagnosis of the current situation as an input to the proposed National Guanaco (*Lama guanicoe cacsilensis*) Conservation Plan, which included data such as the species' currently known population and geographical distribution, its main threats, and the projects or national and international conservation initiatives working on the species. This first workshop saw the participation of state entities competent in the matter from the regions within the guanaco distribution area and the private companies involved.

7. Effects of the proposed amendment

7.1 Anticipated benefits of the amendment

The inclusion of the species in Appendix II of the convention will enable the consolidation of actions to maintain the integrity of the large, medium and small populations throughout their range of distribution, as well as ensuring the connection between the transborder populations for their maintenance and revival.

It is anticipated that their inclusion will make it possible to:

- Prioritize the conservation and management of habitats throughout the species' area of distribution.
- Promote joint actions to address the threat of illegal commerce.
- Broaden efforts to evaluate the state of local/regional conservation with respect to guanaco populations and carry out consistent transborder evaluations.
- Ensure consistent conservation and management measures for shared populations.

This amendment is intended to mitigate, based on the principal of coexistence, the main threats to guanaco populations throughout their area of distribution, including: spatial fragmentation without planning, reducing the mortality rate due to hunting and a lack of planning with respect to the management of domestic cattle.

Presently, the guanaco occupy just 26% of their original area of distribution (calculated by Ceballos and Ehrlich, 2002; based on Franklin, 1982). More specifically, the area of distribution has been reduced by 58% in Argentina, 75% in Chile, and by more than 90% in Peru, Bolivia, and Paraguay (Cunazza et al., 1995; Ceballos and Ehrlich, 2002). Furthermore, their distribution has become fragmented into smaller and relatively isolated populations.

Although the species is not threatened with extinction on a continental scale, the northern subspecies *Lama guanicoe cacsilensis* is forecast to become extinct in Peru within the next 30 years unless current mortality rates due to hunting are reduced (<http://www.iucnredlist.org>). Guanacos are ecologically extinct in most of their remaining area of distribution (Novaro et al., 2000; Ovejero, 2012), and some southern populations run a grave risk of local or even regional eradication (Cunazza et al., 1995).

Recent findings suggest that the inbreeding or aberrant mutations may cause reproductive failures and congenital malformations (Franklin and Grigione, 2005; Zapata et al., 2008; Gonzalez et al., 2014). The increasing pressure from private landowners in Patagonian pastures may be a threat to high-density guanaco populations under their care if their management is not properly planned and implemented.

The live shearing and later release of wild guanacos may contribute to their conservation only if the effects of this activity are properly evaluated and managed. If it is not ecologically sustainable, the viability of the most important guanaco populations will be at risk. A careful evaluation of current management practices with respect to live shearing is currently being carried out, although a long-term evaluation is also necessary. For the guanaco populations subject to a hunting-based strategy, data is urgently required on habitat preferences, flight distances, individual and populational movements, group compositions and the effect on neighboring populations for a proper evaluation of this type of productive system.

7.2 Potential risks of the amendment

No risks have been detected related to the inclusion of the guanaco species in Appendix II of the Convention.

7.3 Intention of the proponent concerning development of an agreement or concerted Action

The proponent States submit their intention to agree on coordination mechanisms within the framework of the CMS to ensure the connectivity and conservation of isolated populations.

8. Range states

The countries included in the specie's distribution range - Bolivia, Chile, Paraguay, and Peru - are in agreement for the submission of this proposal and for its inclusion in the Convention.

9. Consultations

All the countries included in the species' range of distribution have been involved in the consultations.

10. Additional remarks

11. References

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