

Rewilding Patagonia

*in the Wild Patagonia Reserve
Network, guanacos, choiques,
and pumas will roam free*

by Susan Walker, Andrés Novaro, and co-authors

THE PATAGONIAN STEPPE of Argentina is a vast area—almost 750,000 square kilometers—of arid plains and scrub ecosystems in the rain shadow of the southern Andes, at the tip of South America. The name “Patagonia” evokes romantic images of a windy wilderness at the end of the Earth. Indeed, a recent article in *National Geographic* described Patagonia as the “wild, wild south,” and Conservation International has identified the region as a wilderness and one of “Earth’s Last Wild Places,” based on its size, low population density, and purported lack of change in vegetation.

But what is a wilderness or a wild place? It’s an area dominated by natural processes, home to a complete life community, and, for the most part, undisturbed by human activity. Although Patagonia is vast and sparsely populated, and its climate and topography are as harsh and wild as ever, we argue that human activities over the past 100 years have deeply altered the structure and composition of Patagonian wildlife and vegetation communities, and that most of the region is no longer truly wild.

Wildlife of Patagonia

Since the Pleistocene extinctions of 10,000–15,000 years ago, the dominant herbivores of the arid Patagonian steppe and scrubland have been the guanaco (*Lama guanicoe*) and choique (*Pteronornis pennata*, also known as Darwin’s rhea). Guanacos, 100–120 kilogram camelids, are the wild ancestors of the more familiar domestic llama, and choiques are large-bodied, flightless, ostrich-like birds. Until the late 1800s, Patagonia was the domain of the Tehuelches, a nomadic hunter-gatherer people whose livelihood depended largely on the huge herds of guanacos and choiques that occupied this immense landscape. Early European explorers describe herds of guanacos that numbered in the thousands, large flocks of choiques, and even Andean deer (*Hippocamelus bisulcus*, also known as huemul)—which today are found only in rugged forested areas of the Andes—in some parts of the steppe.

The unique wildlife community of arid Patagonia also includes two species of armadillos and a wide variety of rodents that have evolved in niches filled by different taxa in other parts of the world, such as the antelope-like mara (*Dolichotis patagonum*), the rock-dwelling mountain vizcachas (*Lagidium* spp.), the burrowing tuco-tucos (*Ctenomys* spp.), and the cuisies of the guinea pig family (Caviidae). Bird diversity is high, including the majestic Andean condor and many endemic species—southern Patagonia has been identified by

BirdLife International as a crucial area of bird endemism. Endemism is also high among reptiles and amphibians, due to the proliferation of isolated *mesetas* (plateaus) and lakes.

The top Patagonian carnivore is the puma (*Puma concolor*), followed by the coyote-sized culpeo fox (*Pseudalopex culpaeus*). Smaller carnivores include the chilla fox (*Pseudalopex chilla*); the pampas cat (*Lynchaillus colocolo*), and Geoffroy’s cat (*Oncifelis geoffroyi*); two weasel-like mustelids, the grison (*Galictis cuja*) and the smaller huroncito (*Lyncodon patagonicus*); and two hog-nosed skunks (*Conepatus chinga* and *C. humboldti*).

What took the wild out of Patagonia

After his epic journey, 150 years ago, Charles Darwin wrote that the plains of Patagonia “are boundless...and bear the stamp of having lasted, as they are now, for ages.” However, within a few decades a monumental change began to take place in Patagonia, when the first few sheep were introduced by British colonists. After the Tehuelches were decimated by introduced disease and defeated by the Argentine army in the “Conquista del Desierto” in the late 1800s, Europeans and Argentines moved in with huge herds of sheep. These herds reached a peak population of 22 million in the 1950s, and also introduced many exotic wildlife species [IMPLIES THAT THE SHEEP INTRODUCED MANY EXOTICS; IS THIS CORRECT?]. Thus the dominant fauna of most Patagonian landscapes in the twenty-first century are sheep, cows, and goats, rather than guanacos, choiques, and maras. European red deer (*Cervus elaphus*), first introduced in the forest ecotone, are expanding steadily out into the steppe, and European hares (*Lepus europaeus*) and the introduced wild boar (*Sus scrofa*) are ubiquitous, while maras and mountain vizcachas are in decline. Native carnivores prey almost exclusively on introduced European species, since their native prey are present at such low densities that they no longer play a significant role in their ecosystems and are considered “ecologically extinct” throughout large areas. The few places where native wildlife communities remain largely intact are often the poorest lands where for many decades it has not been profitable to maintain livestock.

The decline of native wildlife in Patagonia has been brought about by the same processes that have produced similar losses all over the world: interactions with livestock and exotic species, habitat degradation, and unsustainable hunting. Livestock and other exotics have had a negative effect on native species through direct competition for resources. Guanaco and sheep diets overlap to a large degree, and move-

ment of sheep into an area quickly excludes guanacos. The foraging of one sheep is equivalent to that of five choiques. Where European red deer and guanacos are sympatric, their diets overlap seasonally, and European hares have high dietary overlap with the similarly-sized mountain vizcachas and maras.

In addition to direct competition, the large populations of introduced species have probably had negative effects on native species through other processes. The impact of predation on native prey may have increased due to reduced native prey populations and to predator populations being subsidized by introduced prey. The role that introduced disease has played in the decline of native herbivores is not known, but maras are known to contract diseases transmitted by sheep and European hares. Livestock and other exotics have also indirectly affected native species through overgrazing, which has resulted in severe desertification of at least 25% of Patagonian rangelands. In many parts of Patagonia the lands are so degraded that they can no longer support the stocking rates of sheep they once did, and carrying capacity for native herbivores has probably also been reduced.

Hunting of native Patagonian wildlife was intensive throughout the twentieth century. Guanacos were hunted to reduce their competition with sheep, and commercial hunting of guanaco young for their skins and of choiques for their feathers was heavy and widespread. Mountain vizcachas were also heavily hunted during the 1950s for their hides. All three species and the mara are still hunted for food for subsistence purposes, and choique eggs are collected for human consumption. Additionally, guanacos in the steppe and huemuls in the forest ecotone were heavily hunted as food for dogs brought in by shepherders.

Pumas and culpeos were killed because they prey on sheep. Bounty hunting of pumas was carried out in many places (and is still practiced in one Patagonian province), and pumas were extirpated from most of their former range by the middle of the twentieth century. Poison was widely used to eradicate carnivores, and consequently severely depleted both avian and mammalian scavengers. The small cats and skunks were also hunted heavily for their furs until the export of their skins was banned in the 1980s. Hunting of the two FOX species for fur was intensive, and continues today.

Patagonian carnivores and their prey

During the last 20 years, sheep density and the rural human population density have declined. Concomitantly, hunting

pressure has decreased in many areas. As in North America, in Patagonia some native wildlife has begun to recover as some types of threats have lessened. Unlike in North America, however, the species that have recovered most are the top carnivores. Pumas have recolonized much of their former range throughout Patagonia, and culpeos have increased in number—their density doubled in southern Neuquén province between 1989 and 2002. The distribution of the culpeo actually expanded to the east, perhaps because of high availability of exotic prey, increased water availability due to artificial waterholes for livestock, or to the extirpation of the puma during several decades. The diets of pumas and culpeos are currently overwhelmingly composed of introduced species—the European hare, sheep, wild boar, and European red deer. In many places top carnivores are thriving on this enormous prey base provided by livestock and other exotics, even though populations of their native prey species have not recovered from the tremendous declines they suffered.

For most native herbivores there are no good data on either past or present population sizes, so the exact extent of population reductions over the last century remains unknown. Huemuls that once inhabited parts of the western steppe and steppe-forest ecotone disappeared completely from these habitats. Based on explorer accounts and analyses of plant productivity and forage consumption by guanacos, the number of guanacos in Patagonia prior to European colonization has been estimated at 7–20 million. In recent times, this number has been estimated at 400,000–600,000 individuals, representing 2–9% of the original population. Comparison of the few recent local density estimates for choiques with accounts of early explorers suggests a widespread collapse of populations of that species, a collapse which has continued over the last two decades. Because threats for other native herbivore and omnivore species were similar, it is likely that these have experienced declines of similar magnitude.

Putting the wild back into Patagonia

Wildness and wilderness are defined by wildlife. Patagonia cannot be truly wild without extensive areas where native wildlife species are present in large enough numbers to interact significantly among themselves and with their ecosystem. We hope for a future where the unique Patagonian wildlife communities and their habitats are valued, restored, and preserved, and given a permanent place alongside humans. Our vision is the “rewilding” of Patagonia. This requires a unified, proactive plan for region-wide conservation of native wildlife

through a network of what we call “Tehuelche landscapes”—large, protected core areas with functional native wildlife communities as the Tehuelches knew them, and human-use areas that provide connectivity for native wildlife among those protected areas.

This Patagonian version of rewilding is distinguished from the North American version by the necessity of focusing on large-bodied herbivores, in addition to carnivores. This necessity derives from the drastic human-induced ecosystem changes that have altered the regulatory role of top carnivores in Patagonia. Here, carnivores persist and even do well in some areas where their native prey species have been extirpated. Our challenge is to take advantage of this “gift” of carnivore recovery by re-focusing on native herbivores, which, at present, are more threatened. Carnivores, primarily pumas, must be included as conservation targets and protected in core areas that are large enough to support viable populations, but in order to restore a wild state of natural communities the reserve network must be designed on the basis of the needs of herbivores as well. Therefore we chose the guanaco and the choique, the largest-bodied and widest-ranging herbivore and omnivore, as the focal species for the Wild Patagonia Reserve Network. To restore wildness to Patagonia, these species must once again be numerous enough to be the principal prey of the puma throughout large areas.

Core areas and connectivity

Currently about 4% of arid Patagonia is designated as some type of protected area. However, most of these are reserves in name only, offering little real protection to wildlife, and less than 1% of the land has a permanently assigned warden or ranger. For example, the Auca Mahuida Provincial Protected Area in northern Neuquén province is over 75,000 hectares, contains a large population of guanacos, and represents a major link to the largest protected population of guanacos in the world, that of the Payunia Provincial Reserve in southern Mendoza province. The 2 million hectares encompassing the Auca Mahuida and Payunia reserves and the lands between them are a potential site for a Tehuelche landscape in the Wild Patagonia Reserve Network. Nevertheless, the Auca Mahuida reserve is the site of major commercial oil extraction. The single ranger responsible for the reserve must also patrol a large additional portion of the northeast of the province, although he often doesn't even have a working vehicle, or gas to run it. Thus, better protection and implementation of existing reserves that harbor, or could harbor, large populations of gua-

nacos, choiques, and pumas are priorities. In addition, we must identify important areas that could be made into reserves and the means to convert them into protected areas. New and existing protected areas may have additional conservation and management goals, but management should ensure the persistence of functional populations of guanacos, choiques, and pumas, which will usually require working with owners and occupants of private lands around the reserves.

Between the Tehuelche landscapes would be lands under varying intensities of human use, ranging from towns and cities where most native wildlife is absent, to ranches or indigenous community lands managed for the co-existence of native wildlife and livestock production or other economic activities. These different land uses must be distributed in such a way as to allow for a high degree of connectivity for guanacos and choiques, ensuring that the Tehuelche landscapes do not become island refuges for isolated wildlife populations.

Landscape connectivity for guanacos, choiques, and pumas in Patagonia is probably determined more by human land-use practices and activities than by habitat structure or physical barriers to movement. Wildlife “corridors” in this case would likely be composed of contiguous wildlife-friendly ranches, where sheep density is not high, exotics are controlled, and hunting of native species is limited or not practiced at all. This requires development of economically viable alternatives to sheep ranching. In many parts of Patagonia ranchers have already turned to tourism, hosting fishermen and sport hunters of exotic wildlife [HERE DO YOU MEAN EXOTIC AS “NON-NATIVE” OR AS “EXCITING” AND DO FISHERMAN FISH FOR EXOTIC SPECIES (NON-NATIVE) TOO OR DO THEY FISH FOR NATIVE SPECIES? PLEASE CLARIFY], or to live-capture and shearing of guanacos. These activities can be managed in ways that allow persistence of pumas, guanacos, choiques, and other native wildlife species, at least at low densities or as transients, providing connectivity between populations in protected areas. Indeed the presence of these species may enhance the experience of the tourist, fisherman, or hunter who has been drawn by the lure of a wild Patagonia.

The incorporation of numerous protected landscapes in an interconnected network is important because isolated preserves are often ineffective in conserving guanacos and choiques. For example, Laguna Blanca National Park is a small park (11,250 hectares) in the steppe of Neuquén province where choiques have been protected for over 55 years.

However, this species is declining in the park as well as in the surrounding areas. And in Cabo Dos Bahías, a provincial protected area in Chubut, there was a recent die-off of guanacos. This is because Cabo Dos Bahías is surrounded by sheep ranches where guanacos are actively excluded. The guanacos appear to have died from starvation as they were unable to range beyond the confines of the preserve to forage. These examples illustrate how land use around a protected area can directly affect conservation of wide-ranging wildlife species, even if regulations inside the protected area are strictly enforced.

In contrast to arid Patagonia, a much greater proportion of the Patagonian forests of the Andes have protected area status (about 30%), largely due to the public appreciation of the scenic and recreational value of the montane forests. These protected areas can be linked with the reserve network for arid Patagonia, to provide complementary connectivity and refuge for species such as the puma that use both forest and arid habitats. This could also provide opportunities for the huemul to recolonize the steppe-forest ecotone and parts of the steppe as populations recover.

The path from vision to reality

We have initiated the Wild Patagonia Reserve Network project by mapping the distribution of guanacos and choiques throughout Patagonia, in order to determine which existing protected areas contain these species and where important populations outside of protected areas exist. Next we propose to use these wildlife distribution maps, maps of threats to wildlife, and a map of the existing protected areas to design a network of Tehuelche landscapes and identify where connectivity needs to be restored or maintained. The network design can be used by federal and provincial agencies, NGOs, and other interested parties to prioritize areas for conservation and management interventions and determine appropriate types of action for different places. It will complement ongoing conservation efforts based on other criteria, such as representation, contributing to a comprehensive conservation portfolio for arid Patagonia.

The Wild Patagonia project is an ambitious vision developed collaboratively and shared by people from several different agencies in Patagonia. The obstacles to be overcome and the challenges for the development of the reserve network are great, but we believe they are surmountable. Obstacles include a lack of political will for wildlife conservation, and differences in values, opinions, and goals of different sectors of Patagonian society. Some Patagonian provinces and the federal govern-

ment are still offering subsidies to ranchers to maintain or increase sheep production. The greatest biological challenge is arguably the problem of ubiquitous exotic wildlife.

Opportunities and possibilities also exist, however. Perhaps the first and foremost possibility arises from the conditions that have led many to claim that Patagonia is a wild place: low human population density and limited and highly concentrated urban development. The habitat is still there, not completely intact, but present in large, open landscapes. Pumas have been able to recover throughout most of the region and guanacos have quickly moved back into some areas when sheep have been removed. Second, in many areas ranchers are already searching for and exploring productive activities that serve as alternatives or complements to sheep ranching, as declining carrying capacities and fluctuating world wool prices have made it a less-profitable activity. Finally, the popular conception of Patagonia as a wild place, and its promotion as such for tourism, hunting, and fishing, may provide an opportunity to build public consensus for a Wild Patagonia Reserve Network.

Michael Soulé and Reed Noss have said in this journal that the greatest impediment to rewilding is an unwillingness to imagine it. We invite politicians, ranchers, schoolchildren and their teachers, rural settlers, indigenous communities, tourists, fishermen, all of our colleagues in government agencies and NGOs, and the rest of Patagonian society in Argentina and Chile to join us in imagining a truly wild Patagonia, where the extraordinary native wildlife on which the Tehuelches depended until the nineteenth century can flourish in the twenty-first. ☾

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Conservacion Patagonica

Conservacion Patagonica (formerly the Patagonia Land Trust) supports the preservation and restoration of land in the Patagonia region of Chile and Argentina. Started in the spring of 2000, Conservacion Patagonica's first project was the purchase of Estancia Monte Leon, a 155,000-acre ranch on the Atlantic coastline in the Santa Cruz province—for the express purpose of giving the property to National Parks of Argentina. In November 2002, Monte Leon was formally donated, forming the first-ever coastal national park in the country.

In July of 2004, after nearly a year of negotiations, Conservacion Patagonica purchased Estancia Valle Chacabuco, a 173,000-acre ranch in the Patagonia region of Chile. The purchase was motivated by the similar goal of establishing a new Chilean national park in a unique and biologically important area. We're now in conversations with the Chilean government regarding the potential donation of the property to Chile to be incorporated into a new national park that would include two other Chilean national reserves contiguous to the estancia.

Kristine McDivitt Tompkins started Conservacion Patagonica, a non-profit foundation. To learn more about the work of Conservacion Patagonica visit www.patagonialandtrust.org.