

Patagonian Steppe

1. Geography and Climate

a. Geographic location

- i. The Patagonian Steppe covers 188,000 square miles at the southern tip of South America, primarily in Argentina with a small area in Chile. It spans from the eastern foothills of the Andes to the Atlantic Ocean, from the Monte desert to the north to Tierra del Fuego at the southern tip of the continent.
- ii. This region is latitudinally equivalent to Washington state and Oregon.

b. Topography

- i. The steppe topography features vast plains, rocky foothills, grassy stepped plateaus, river valleys and canyons.
- ii. Marked by seasonal lakes and streams.
- iii. The tableland region rises to an altitude of 5,000 feet.

c. Climate

- i. The Patagonian Steppe is in the rain-shadow of the Andes, the climate is very dry and cold.
- ii. Two climatic zones:
 1. northern, semi-arid zone. mean annual temperature between 53° and 68° F, and annual rainfall between 3.5 to 17 inches.
 2. southern zone, cold, dry climate (desert). mean annual temperature ranging between 39° and 55° F, and annual precipitation, including snow and rain, ranges between 5 and 8 inches.
- iii. Cold desert. Highest temperature is 68° F, rarely exceeds 53 °F, and averages just 37 °F.
- iv. Essentially two seasons, summer and winter, with spring and fall only occurring as brief transitions. Winter generally lasts for five months from late April to mid September.
- v. Frost and snow can occur at almost any time of year.
- vi. Precipitation is scarce, ranging from 4 to 12 inches per year, concentrated on the coldest months, from April to September.
- vii. One characteristic of the Patagonian Steppe are strong winds. In spring and summer, strong west winds blow almost constantly.



2. Range of ecosystems

a. What types of biomes are present and where are they?

- i. Approximately 45% of the steppe's territory is made of arid shrublands, 20% of grasslands, 30% of a combination of shrubs and grasslands and the remaining 5% of water bodies (rivers and lakes), wetlands and meadows.
- ii. Monte vegetation and open shrublands are found in the northern part of the region, while the southern portion has extremely sparse, low-lying vegetation. The central part of the steppe is dominated by shrubs and herbaceous species, grasslands occur where the precipitation is higher.
- iii. Towards the west, shrublands give way to the Argentine Monte temperate grasslands and the semi-forested slopes of the Andes. A narrow strip along the western boundary of the region supports a mix of deciduous and coniferous forests. The more western parts of the steppe host lakes of glacial origin and grades into barren mountains or cold temperate forests along valleys.

b. Arid shrublands

- i. The Patagonian Steppe extends northwest as shrubland steppe and to the north as thorn thicket, gradually making the transition to Argentine Monte. This area is a cold desert scrub-steppe, with almost constant wind and year round frosts likely.
- ii. Thick patches of low shrubs and scattered grasses dot the characteristic bare soil, sand, and rock here. The flora associated with the dry climate is predominantly characterized by grasses and shrubby vegetation that is adapted to rocky, sandy soil.
- iii. Common shrubs: Neneo (*Mulinum spinosum*), Calafate (*Berberis heterophylla*), Molle (*Schinus sp.*), Quilembai (*Chuquiragua avellanadae*), Mata de fuego (*Anarthrophyllum desideratum*), Colapiche (*Nassauvia glomerulosa*), Mata negra (*Junellia tridens*) and the Jarillas of the *Larrea* genus.



c. Grasslands

- i. The southern portion of the Patagonian Steppe transitions into the Patagonia grasslands which reside at the very southern tip of the continent.
- ii. The grasslands are made Coirones, evergreen grasses provided with hard and sharp leaves that form short and compact bushes. The most common are the White (or sweet) Coirón (*Festuca pallescens*), the Bitter Coirón (*Stipa speciosa*), the Poa Coirón (*Poa ligularis*) and the Fuegian Coirón (*Festuca gracillima*).

3. Hydrology and Soils

a. Soils

- i. Soils are variable but generally rocky-sandy and poor in fine materials and lacking organic matter.
- ii. Soils are just as variable and wide spread as the vegetation and range from haplustols to salorthids to ochraquepts.
- iii. The best soils are found north of the Negro River, where parent material is volcanic rock. Going south, the soils become increasingly arid and rocky. Broad expanses of stream-rounded pebbles, called *grava patagónica*, often are found on level ground.

b. Hydrology

- i. Deep wide valleys rimmed with high cliffs cut west to east across the tablelands, all river beds of former rivers that flowed from the mountains to the Atlantic Ocean. Only a few remain as permanent streams flowing from the Andes. The streams in most valleys flow intermittently, and some are completely dry. Some streams terminate in basins containing salt flats or salt ponds.



4. Plant and animal species

a. Plants

- i. The flora of the region reflects its climate. In general, the vegetation is xerophytic and highly adapted for protection against drought, wind and herbivores. A relatively small amount of species of grasses and shrubs are able to withstand the harsh conditions of the Patagonian Steppe through a variety of evolutionary adaptations.

- ii. The steppe vegetation is mainly made of two types of plants: low shrubs with small leaves and thorns and grasslands of the *Stipa* and *Festuca* genres. Several species of desert shrubs like *Acantholippia* and *Benthamiella*, and *Nassauvia*; and tuft grasses like *Stipa* and *Poa*.
- iii. Aquatic grasses and larger flora exist on the outskirts of the desert and around the ephemeral lakes that form from the Andes' runoff.
- iv. Cushion plants of *Mulinum spinosum* and *Brachyclados caespitosus*.
- v. species with heteroblastic growth and small limited-growth branches covered with tight leaves.
- vi. Taller woody shrubs : *Anarthrophyllum*, *Berberis*, *Schinus* and *Verbena*
- vii. Valleys and lowlands with higher amounts of water available to vegetation host species sedges (*Eleocharis*), rushes (*Juncus*), grasses (*Agrostis*, *Hordeum*, *Polypogon*) and in saline areas species of halophytic species (*Distichlis*, *Nitrophila*, *Puccinellina*).
- viii. Hierba negra (*Mulinum spinosum*) A small herbaceous shrub endemic to the Patagonian desert of Chile. This cushion plant has a round shape, with prickly, grayish-green foliage. In spring and early summer waxen red flowers appear that provide valuable forage for animals.
- ix. Mate negro (*Junellia tridens*) Common throughout the Patagonian desert, thrives under the cold, dry conditions of the region. The strong winds and scant precipitation keeps mate negro low in height, it bears a profusion of tiny succulent leaves along its densely arranged and scraggly branches. The unique tiny leaves maintain moisture close to its branches.
- x. Palo amarillo (*Berberis montana*) This shrub thrives between 3,000 and 9,000 feet throughout the Patagonian desert. Growing to 7 feet high, palo amarillo is known for its springtime bloom of golden-yellow flowers, and an autumn crop of round blackish-purple edible fruit. Although it is drought tolerant, it prefers high humidity with seasonal bouts of high heat.
- xi. Peppertree (*Schinus latifolius*) An evergreen species, peppertree is found in lowland coastal areas of the Patagonian desert. Known for its small purplish berries in late summer, peppertree is identifiable by its leathery, crinkled leaves and dark coffee-colored bark. Growing up to 32 feet high, this small tree has a spreading growth habit with a squat, gnarled trunk.



- xii. Endemic species: two endemic species of the genus *Prosopis* (Mesquite), one species of *Larrea* (Creosote) and species of the genera *Lycium* (box-thorns) and *Schinus* (Pepper tree).

b. Reptiles and amphibians

- i. Amphibians include the endangered Andalgala water frogs, Argentine toads, and Gray four-eyed frogs.
- ii. Reptilians include King's tree iguanas, Darwin's marked geckos, and Darwin's iguanas.
- iii. Reptiles are well adapted to arid environment of the Patagonian Steppe, so there is a good amount of endemic species
 - 1. *Liolaemus* genus
 - 2. *Liolaemus magellanicus*
 - 3. Matuastos (*Diplolaemus* sp.)
 - 4. Geckos (*Hormonata darwini*)
 - 5. Yarárá Ñata (*Bothrops ammodytoides*) the southernmost venomous snake in the world.
 - 6. Patagonian Frog (*Atelognathus patagonicus*)
 - 7. Frog of the Basalt (*Atelognathus praebasalticus*)

c. Birds

- i. Bird life in the Patagonian Steppe is diverse, there are more than 200 bird species including around ten endemic species of birds.
- ii. The southern caracara (*Caracara plancus*) is one of the characteristic sights of a Patagonian landscape; there are also: austral parakeets (*Enicognathus ferrugineus*), green-backed firecrowns (*Sephanoides sephanioides*), Chilean flamingo (*Phoenicopterus chilensis*), the upland goose (*Chloephaga picta*) and one of the largest birds in the world, the Andean condor (*Vultur gryphus*).
- iii. Some other species
 - 1. Lesser Rhea (*Rhea pennata*) a big flightless bird with long and strong legs, like ostrich and emu.
 - 2. Elegant-crested Tinamou (*Eudromia elegans*)
 - 3. Patagonian Tinamou (*Tinamotis engoufi*)
 - 4. Least seedsnipe (*Thinocorus rumicivorus*)
 - 5. Burrowing parrot (*Cyanoliseus patagonus*)
 - 6. Other prominent birds of the Patagonian Steppe are the Patagonian Mockingbird (*Mimus patagonicus*), the Correndera Pipit (*Anthus correndera*) and the Long-tailed Meadowlark (*Sturnella loyca*).



7. *Emberizidae*, which feed mainly on seeds and grains so they have a suitable thick cone-shaped bill.
 - a. Common Diuca-Dinch (*Diuca diuca*), Patagonian Yellow-Finch (*Sicalis lebruni*), Gray-hooded Sierra-Finch (*Phrygilus gayi*) and Mourning Sierra-Finch (*Phrygilus fruticeti*) belong to this group.
8. Ovenbirds, a family of dull-colored insectivore birds found in Mexico, Central and South America.
 - a. Miners (*Geositta spp.*), Earthcreepers (*Upucertia spp.*), Canasteros (*Asthenes spp.*), White-throated Cacholote (*Pseudoseisura gutturalis*) and Plain-mantled Tit-Spinetail (*Leptasthenura aegithaloides*).
9. Tyrant flycatchers, with several species on the Patagonian steppe
 - a. Shrike Tyrants (*Agriornis spp.*), Chocolate-vented Tyrant (*Neoxolmis rufiventris*), Rusty-backed Monjita (*Neoxolmis rubetra*) and the Ground-Tyrants (*Muscisaxicola spp.*). The latter are usually seen on the high-altitude Andean steppes.
10. Birds of prey:
 - a. Black-chested Buzzard-Eagle
 - b. Red-backed Hawk (*Buteo polyosoma*)
 - c. Cinereous Harrier (*Circus cinereous*)
 - d. Peregrine Falcon (*Falco peregrinus*)
 - e. American Kestrel (*Falco sparverius*)
 - f. Burrowing Owl (*Athene cunicularia*)



Patagonian Yellow-Finch (*Sicalis lebruni*)



d. Mammals

- i. The guanaco (*Lama guanicoe*), the puma, the Patagonian fox (*Lycalopex griseus*), the Patagonian hog-nosed skunk (*Conepatus humboldtii*), and the Magellanic tuco-tuco (*Ctenomys magellanicus*) are the most characteristic mammals of the Patagonian plains.
- ii. Southern viscachs, burrowing owl, lesser rhea, mara, pygmy armadillo, desert iguana, western ribbon snake, vicunas, and various species of eagle and hawk are a few of the variety of animals living in the region.
- iii. mammals on the Patagonian steppe are the Pampas Cat (*Lynchailurus pajeros*), the Patagonian Skunk (*Conepatus humboldtii*), the Patagonian opossum (*Lestodelphys halli*), the Patagonian Weasel (*Lyncodon patagonicus*) the Lesser Grison (*Galictis cuja*), the Southern Dwarf Cavy (*Microcavia australis*) and the Tuco-tuco (*Ctenomys spp.*).
- iv. Guanaco (*Lama guanicoe*) Herbivore of the camelid family, capable of digesting the thick grasses and the sprouts of some shrubs.
- v. Puma (*puma concolor*), the main predator here, the most widely-spread feline in America,

1. The largest predator in Patagonia and the southernmost dweller of all its relatives. Pumas take full advantage of the varied terrain and are able to live in the cold, warmth, forest & mountains. They are most often seen at dusk and dawn when hunting for guanacos.
 - vi. The Southern pudu is the world's smallest deer.
 - vii. Red Fox (*Lycalopex culpaeus*)
 - viii. Grey Fox (*Lycalopex gymnocercus*),
 - ix. Patagonian Mara is a big-sized rodent, endemic of the Patagonian steppe and the *Monte* region. Its look is similar to a hare, but provided with much longer legs.
 - x. armadillos, a family exclusive of America.
 1. Larger Hairy-armadillo (*Chaetophractus villusus*) and the Pichi (*Zaedyus pichiy*). Hairy armadillos have long hair between their plates.
 - xi. A wild horse herd has resided in the mountains in Chilean Patagonia, for more than a century without any human contact. They are considered one of the largest and last wild horse herds in the world.
- e. Endangered Species
- i. A number of species that inhabit the Patagonian steppe are at risk of extinction, including the near-threatened mara (*Dolichotis patagonum*)
 - ii. the endangered huemul or South Andean deer (*Hippocamelus bisulcus*) the national animal of Chile.



5. Land Use and Impacts

- a. Grazing - mostly sheep, some cows
 - i. The steppe vegetation of the desert supports a large community of livestock, especially sheep, which are raised by the ranchers living and working in the Patagonian Desert region.
- b. Mineral extraction
 - i. Oil extraction is the most intensive anthropogenic disturbance, though it is restricted in extent.
 - ii. The Patagonian Desert also hosts vast mineral reserves of iron ore, manganese, uranium, zinc, copper, and gold.
- c. Impacts
 - i. The vegetation of the Patagonian Steppe is being continually lost to overgrazing by livestock, especially sheep, and occasionally cattle. This is leading to a rapid loss of ecological balance in the region. Approximately

35% of the Patagonian steppe is facing severe desertification, and more than 90% of the region suffers from soil degradation.

- ii. The desertification is due largely to overgrazing, primarily by sheep. Overgrazing has damaged the limited plant coverage and exposed the soil to erosion. In addition to overgrazing, this region's dry climate, strong winds, and cold winters also contribute to the desertification processes.
- iii. Primary productivity has reduced, along with the provision of ecosystems services such as carbon capture, hydrological regulation, decomposition, nutrient cycling and mound dynamics. Climate change will continue to aggravate this scenario.
- iv. The native fauna of the region is also facing tough competition from ranchers' grazing livestock in terms of food resources on the sparsely vegetated desert steppe lands. Many ranchers also tend to poison large native carnivores like foxes and pumas in fear that these might attack their livestock. The native wild species are also hunted for their body parts, meat, skin, and feathers, or just for sport, leading to rapid declines in the populations of many species.
- v. Raging wildfires in the Patagonian steppe also threatens the biodiversity of the region.

6. Protection and Management

- a. Who owns and manages this land.
 - i. Nearly 90 percent of the grassland in southern Argentina is privately owned and most of this region is used for grazing sheep.
 - ii. This ecoregion has many natural reserves. There are twenty protected areas that cover around 2,500,000 hectares (approximately 3% of the region).

