

Population: 8,000,000  
Surface Area: 2,027,460 km²

# NORTH AMERICAN DESERTS

The North American Deserts ecological region extends from eastern British Columbia in the north, to Baja California and north central Mexico in the south. The region is distinguished from the adjacent forested mountain ecological region by its aridity, its unique shrub and cactus vegetation with a lack of trees, and generally lower relief and elevations. Population centers have historically been small, but several urban areas like Las Vegas have recently experienced rapid growth.

## Physical setting

The North American Deserts are comprised of a mix of physiographic features but, in general, the area consists of plains with hills, plains with mountains, and tablelands of high relief. In the north, the flat to rolling topography of the Columbia/Snake River Plateau consists of loess and volcanic ash deposits on basaltic plains. The Great Basin and and it adjacent mountains contain hundreds of north–south trending fault-block mountain ranges separated by broad valleys; the valley floor elevations are often over 900 m above sea level and many of the ranges exceed 3,100 m. To the south, the mountatin ranges are smaller and less regularly oriented and rise from lower base levels. The lowest basin point, Death Valley, is 86 m below sea level. Within the basin are found many dry lake beds, or playas, with alluvial fans and bajadas at the margin slopes. Sand dunes occur in some areas. The spectacular landscapes of the Colorado Plateau occur on uplifted and deeply dissected sedimentary rocks. Wind and water erosion has left impressive canyons, cliffs, buttes and mesas. Soils of the region are dry—generally lacking organic material and distinct soil profiles—and are high in calcium carbonate.

This ecological region has a desert and steppe climate: arid to semi-arid, with marked seasonal temperature extremes. This aridity is the result of the rain shadow of the Sierra Nevada, Cascade Mountains and Sierra Madre ranges as they intercept the wet winter air masses brought by the westerly and easterly winds. The Rocky Mountains also block some moist Gulf Coast air masses that cross the Great Plains. The Mezquital and Tehuaen Valleys occupy the southern-most region of the North American deserts. The climatic condition in this region is the result of the rain shadow produced by the Eastern Sierra Madre and the Neovolcanic Ridge. Average annual precipitation ranges from about 130 mm to 380 mm. The southern deserts have higher average temperatures and evaporation rates, with record-high temperatures in Death Valley reaching 57°C. Some southern areas, such as the Sonoran and Chihuahuan deserts, are dominated by a more episodic summer rainfall pattern, while the northern deserts tend toward a winter moisture regime with some precipitation falling as snow.

## Biological setting

In this ecological region of altitudinal, latitudinal and landform diversity, there is a variety of vegetation types but low growing shrubs and grasses predominate. In the northern, Palouse area, grasslands and sagebrush steppes were once common. However, most of these northern grasslands have been converted to agriculture and, in some areas, the sagebrush steppe is being invaded by western juniper and cheatgrass. The Great Basin is characterized by sagebrush, with shadscale and greasewood on more alkaline soils. Creosote bush is common in the Mojave desert, a desert that also contains areas of the distinctive Joshua tree. The Sonoran desert has greater structural diversity in its vegetation than the other North American deserts that are dominated by low shrubs. Paloverde-cactus shrub vegetation includes various types of cacti, such as saguaro, cholla and agave. Plants of the Chihuahuan desert scrub are often shorter with sparser foliage than similar plants of the Sonoran or Mojave deserts. Tarbush and creosote bush are dominant shrubs, and grasses are intermixed throughout much of the Chihuahuan desert. The bajadas and hills include ocotillo, Joshua tree, lechuguilla and prickly pear.

Larger mammals are not abundant in the deserts area, but include mule deer, pronghorn antelope, coyotes, bobcats and badgers. Feral burros and feral horses are also found. Jackrabbits, cottontail rabbits, ground squirrels, kangaroo rats, mice and bats are the most common mammals. Birds include golden eagles, several western hawk species, ravens, roadrunners, mourning doves and black-throated sparrows. Some birds are characteristic of the sagebrush communities such as the sage thrasher, sage sparrow and sage grouse, while others are restricted to the southern warmer deserts, e.g., Gambel’s quail, scaled quail, Gila woodpecker, Costa’s hummingbird and curve-billed thrasher. Reptiles include the gopher snake, various species of rattlesnake, sagebrush lizard, horned lizard, geckos, Gila monster and desert tortoise. Due to human modifications of aquatic habitat, many of the listed species of threatened or endangered animals are fish. These include the bonytail chub, humpback chub, Sonora chub, Chihuahua chub, beautiful shiner, Pecos bluntnose shiner, razorback sucker, Colorado squawfish, Pyramid Lake cui-ui and Lahontan cutthroat trout.

## Human activities

Aboriginal hunter-gatherer populations in these desert areas were small, and their impacts on the environment were slight. Some Native American cultures in the southwestern deserts practised intensive agriculture locally, employing canal irrigation, terraces, and checkdams. Irrigation was also conducted by Spanish settlers in the southern part of the region, and by Mormon settlers in Utah from the mid-1800s.

Today, large-scale irrigated agriculture is found in parts of the Columbia Plateau, Snake River plain, Wasatch piedmont, upper Rio Grande, Salt and Gila valleys, Imperial Valley, Mexicali Valley, and river valleys such as the Rio Sonora, Rio Yaqui, and Rio Fuerte in southern Sonora and northern Sinaloa. In the north central Chihuahuan Desert, there are important irrigated areas such as Rio Conchos Valley and La Laguna region. Although only a small fraction of the region’s land is in agriculture, it is the largest user of water resources, which originate largely outside the ecological region. Salinization, sedimentation, toxic pesticides and sufficient water quantity and quality for aquatic biota are concerns in these areas. Crops in the north include wheat, dry peas, lentils, potatoes, hay, alfalfa, sugar beets, apples and hops, while southern irrigated areas grow cotton, alfalfa, grapefruit, dates, lettuce and other vegetables. The economy of the region has historically been based on primary production, especially from irrigated agriculture, livestock raising (sheep and beef) and mining. The introduction of domestic livestock grazing in the mid- to late-nineteenth century has had significant ecological and hydrological effects. Cattle grazing is common throughout the North American Deserts ecological region, as well as in many of the surrounding mountainous upland regions.

Mining in the area has led to the appearance and abandonment of many small towns devoted to tapping mineral resources such as copper, gold, silver, iron, coal, uranium and salts. Today, tourism and recreation are becoming increasingly important contributors to local and regional economies. Human population density in the region remains relatively low. The cities are few and scattered, but are growing rapidly. The largest urban areas are Phoenix, El Paso-Ciudad Juarez, Salt Lake City, Las Vegas, Tucson, Mexicali, Albuquerque, Spokane, Hermosillo, Chihuahua and Torreon. Total population amounts to 8 million. Much of the land in the US portion of the region is in public domain. A checkerboard pattern of land ownership among federal, state, Indian and private land owners complicates land and resource management.

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Photo: P. Rissler, National Biological Service

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Photo: F. Takaki

1 Cirio (*Fouquieria columnaris*) in the Baja California desert.

2 Reptiles, such as this collared lizard, are important inhabitants of desert ecosystems.

3 Semi-permanent crop (alfalfa) in a valley near Cuatrociénegas, Coahuila.