

SUBDIVISIONS (REGIONS) OF THE SONORAN DESERT

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The principal regions (= subdivisions) of the Sonoran Desert are:

- (1) Arizona Upland (in AZ) – wettest Region of Sonoran Desert
- (2) Lower Colorado River Valley (in AZ) – driest Region of Sonoran Desert
- (3) Central Gulf Coast
- (4) Plains of Sonora
- (5) Vizcaíno
- (6) Magdalena Plain

Two other notable habitats:

- (7) Apacherian Scrub Community
- (8) Riparian Communities

Arizona Upland Region

1. The most famous and well-known subdivision of the Sonoran Desert. Most of the area around Tucson is AZ Upland.

- Centered around 3,000ft. (1,000m) elevation, 90 percent of this region is on mountain slopes; the highest and coldest region of the Sonoran Desert. Above 3,500ft it gives way to desert grassland and Apacherian Scrub communities.

- In Mexico, it occurs only in the foothills of the Sierra Madre of Sonora. In Arizona, it extends north all the way to the lower elevations of the Mogollon Rim.

2. The best watered region of all of America's deserts. Average annual rainfall is 8"-16".

3. Many of the trees are those occurring only in the washes of the Lower Colorado River Valley subdivision, *e.g.* blue paloverde, ironwood, mesquites (*Prosopis* spp.), and cat-claw acacia.

- Characteristic cacti include about a dozen species of cholla's (*Opuntia*'s), *e.g.* buckhorn, chain fruit, teddy bear, Christmas cactus, pencil cholla.

- Other characteristic cacti include the saguaro, organ pipe, senita, barrels, and mammalarias.

- Sometimes called a "saguaro-paloverde" forest.

Lower Colorado River Valley Region

1. The largest, hottest, and driest subdivision of the Sonoran Desert.

- Encompasses the upper Sea of Cortez, running along the coasts of both N Baja and N Sonora.

- Summer highs may exceed 120°F, with soil surface temperatures of 180° F.
 - Annual rainfall in this Region is less than 3 inches, with some areas experiencing up to 3 years with no rainfall at all.
2. Sand soils predominate, including the Gran Desierto, a "sand sea" running from the Algodones Dunes of Yuma, to the great dune fields of El Pinacate.
 - This sea of sand has its origins in Colorado River sediments. For the past 10,000 years, westerly winds have carried the fine deltaic sediments from the Colorado River delta eastward, forming the extensive sand dunes that cover nearly 8,000 km² – this is the Gran Desierto – the largest sand sea in the New World.
 3. Plant growth is open and simple, reflecting intense competition between plants for water.
 - Most commonly encountered plants are: Creosotebush (*Larrea*), Bursage (*Ambrosia*), and saltbush (*Atriplex*). Creosote and bursage are probably the 2 most drought-tolerant plants in North America.
 - Creosote's are very regularly spaced, whereas bursage are clumped. The even spacing of creosotebush has long been a matter of speculation, the most commonly cited explanation being root competition. Bursage are thought to be clumped due to soil type.
 - In drier areas, the ground often forms a "desert pavement," a single layer of tightly packed pebbles, most coated with a shiny, dark, microbial-generated varnish, and largely devoid of perennial plants.
 - In wetter, wash communities one finds plants more typical of the AZ Upland Region: mesquite, ironwood, paloverde, smoketrees, desert willow, and chuparosa.
 4. This is the only part of the Sonoran Desert that extends into CA, where it is sometimes inappropriately called the "Colorado Desert."

Central Gulf Coast Region

1. Also a region of extreme aridity; average rainfall less than 5 inches/year.
 - The landscape comprises widely spaced larger plants, such as *Bursera*, ocotillo (*Fouquieria*), and Creosote (*Larrea*), as well as paloverde, mesquite and ironwood trees, and giant columnar cactus (saguaro and cardon). Cardon (*Pachycereus pringlei*), a relative of the saguaro, is the largest cactus in the world.
2. One of the most beautiful regions of the Sonoran Desert occurs in the coastal area between Hermosillo and Guaymas, where the red rock landscape is punctuated by an assemblage of the most stunning Sonoran plants.
 - At the heads of the mountain canyons, in the low coastal mountains of this region, are groves of Mexican blue palm, giant fig trees, abundant tinajas, and a highly diverse plant community that mixes Sonoran Desert plants with tropical Sinaloan Thornscrub vegetation.

3. In isolated areas of the Sonoran coast are localized occurrences of species otherwise endemic to Baja, e.g., boojum (*Fouquieria columnaris*), palo blanco, Palmer fig (*Ficus palmeri*). These are thought to have reached the mainland by long-distance dispersal (from Baja) in glacial periods when sea levels fell hundreds of feet, narrowing the water barrier between the mainland and Baja.

Plains of Sonora Region.

1. A small region in central Sonora, but perhaps the most complex of the Sonoran regions.

- Annual rainfall averages ranging from 2"-7" depending on the area.

2. As the name suggests, most of this Region consists of broad valleys between widely separated ranges.

- The predominate landscape is open stands of sun-loving legume trees 4-10m in height: e.g. ironwood, paloverde (foothill, blue, and palo brea), and velvet mesquite.

3. Most of this region has been destroyed, converted to agriculture in the last 50 years (see "History of Sonora," in your field reader).

Vizcaíno Region

1. A small, low, coastal region that lies wholly within the Pacific coast of Baja California, extending from the CA coastal chaparral region (~30°N) to the Magdalena Region of the Baja Peninsula (26°15'N).

- The "Vizcaíno Desert" is so unique it has been designated an international Biosphere Reserve.

2. Due to the cooling effects of the Pacific and the Sea of Cortez, mean summer temperatures are 5-6°C lower than for any of the other Sonoran Desert regions.

- Although it gets very little rainfall (<5 inches/yr), it is not the driest desert because of its exposure to the cool California Current, which brings nightly fog to this coastal desert. The fog extends many kms inland, and to altitudes of 1,000m. This region is often called a "fog desert."

3. Dominated by fleshy-leafed shrubs, such as agaves, yuccas and Dudleya's.

- Higher elevations are home to the bizarre boojum or cirio tree (*Fouquieria columnaris*), giant white elephant trees (*Pachycormus discolor*), giant cardon cactus (*Pachycereus pringlei*), strangler figs (*Ficus petiolaris palmeri*), and blue palms (*Brahea armata*).

4. The long separation of the Baja peninsula from the mainland (5-10 million years) has resulted in the absence of some animals highly characteristic of the mainland Sonoran Desert, e.g. Gila monster, desert tortoise, chuckwalla, gambel quail, curve-billed thrasher and javelina.

Magdalena Region

1. This region of the Sonoran Desert occupies the coastal plains of southernmost Baja.
2. Rains come only in the summer, and average less than 3 inches/yr.
3. Along the coast, the only endemic plant is the bizarre creeping devil (*Stenocereus eruca*) a cactus that actually creeps across the desert floor. But in the foothills occur many tropical plants derived long ago from the Sinaloan Thornscrub community of the mainland.

Other Habitats:

Apacherian Scrub-Savanna

1. The B2C campus is on the border between two very different regions of the Sonoran Desert: AZ Upland and savanna/desert grassland of lower montane elevations.
- It isn't quite desert scrubland OR grassland.
 - Tony Burgess considers this region so unique as to deserve its own name -- "Apacherian Scrub-Savanna."

Riparian Communities

1. Riparian communities are not biomes *per se*. They are ribbons of deciduous forest that can occur within any biome, wherever there is perennial water at or near the surface.
 2. In the Sonoran Desert, low elevation riparian habitats support mesquite forests ("mesquite bosques").
- Higher elevation riparian habitats support cottonwoods and sycamores.
 - Montane streams support alder and aspen.
2. Riparian habitats occupy less than 5% of the Sonoran Desert, but support about 85% of its overall species diversity.
 3. Most desert streams run underground most of the year (in "washes"), running on the surface only intermittently during the summer monsoon season.
- Many of Arizona's washes used to be perennial surface streams (*e.g.*, the Santa Cruz River, Salt River, Rillito River), but over-draft of the water table has dried them all up. River boats actually used to sail the Gila and Colorado Rivers.