

· THE GRAND CANYON ·

A PLACE FOR EVERYTHING



LIFE ZONES AND ECOSYSTEMS
IN GRAND CANYON

The female mountain lion stalks silently and swiftly through a grassy clearing beneath swaying ponderosa pines. A hundred yards away, a small group of deer, necks stretched to reach the higher branches, browses delicately on cliffrose, innocent of the lion's approach. As the lion nears, a doe raises her head momentarily, but returns to her feeding. Moving more closely, the female cat crouches in total alertness; in a single leap, she sinks her sharp claws into the doe's back, aiming for the jugular. The deer collapses, and the rest of the herd flees. The hungry cat has enough food to feed her gnawing hunger and that of her cubs.

The laws of nature prevail. The hierarchy is upheld. The need to survive has made the mountain lion and the deer what they are. In the Grand Canyon, such scenes take place daily, on varying levels, as the basic tasks of birth, growth, and death are completed.

The interrelationships of the animals with each other and with the physical conditions of their environment constitute a science known as ecology. The root of the word "ecology" comes from the Greek "oikos" which means "home." Because of its extreme length and depth, the Canyon includes great diversity in its ecosystems. From the rim to the river, one passes from subalpine forest to desert. A person would have to travel from Mexico to Canada to pass through as many different climatic zones.

While climate is responsible for the creation of a unique ecosystem, factors such as soil type and slope are also involved, which accounts for the blurring between ecosystem boundaries. For example, pockets of Douglas-fir grow below the rim, outside their normal range, in cool, shaded north-facing slopes. In the 1880s a scientist by the name of C. Hart Merriam introduced a concept known as life zones, using latitude to define the zones. While his idea is still valid, biologists now look at environments more specifically because of the different communities that might be found in one zone. One way to define these communities is by the plants that grow within them. Thus, in Grand Canyon, visitors to the North Rim would find a coniferous forest

made up of ponderosa pine, blue spruce, and white fir; on the South Rim a pinyon pine-Utah juniper woodland; in the Canyon a desert scrub region; and by the Colorado River and sidestreams a community of water-loving trees and plants.

The pine forest which is home to the mountain lion and mule deer exists on the North Rim because it is higher, cooler, and wetter. At 8000-9000 feet (2430-2740 m), the North Rim receives a greater amount of snow and more rain than the South Rim. Broad, grassy meadows, fringed with dark spruce, fir, and aspen, dot the landscape. An average of 26 inches (66 cm) of precipitation falls on the North Rim annually. The snows melt in late spring, and

Parks are for animals as well as for rocks, for plants as well as for rainbows, and every living organism has a niche in the total system. Each element of the environment has been fitted precisely to its present position and its present functions.

Ann and Myron Sutton
Wilderness of the Grand Canyon

arrive early in autumn. It is ideal habitat not only for larger mammals, but also smaller ones such as ground and tree squirrels, nuthatches, chickadees, and jays.

While ponderosa are found as a transition species on parts of the South Rim where more soil and moisture are present, the primary vegetation consists of the gnarled, dwarfed pinyon and juniper trees. The pinyon, with its short needles and small cones, yields a healthy pinyon nut crop every three or four years which helps feed resident rock squirrel and jay populations. The junipers' paper-thin bark is often covered with neatly spaced rows of holes produced by sapsuckers and woodpeckers. The small size of the pinyon and juniper trees is evidence of their struggle to live in a dry climate. The

South Rim's fifteen inches (38 cm) of precipitation, ten inches (25 cm) less than the North Rim, makes it necessary for the trees to grow slowly, conserving what little water they can. Coyote, mule deer, and a rare bobcat or mountain lion live in this forest.

Descending into the Canyon, the pinyon-juniper association gradually gives way to the desert. Temperatures can reach 120 degrees F (49 degrees C) and rainfall is less than ten inches (25 cm) a year. The Tonto Platform, 3000 feet (900 m) below the rim, best exemplifies the desert scrub community. Grey-green, knee-high shrubs, carefully spaced to take advantage of moisture, cover the platform. Blackbrush is the dominant shrub, but other plants, including Mormon tea, saltbush, snakeweed, yucca and agave, are also found.

Plants and animals of the Inner Canyon have developed some amazing adaptations to survive in this hot, dry environment. Black-tailed jackrabbits stay out of the heat during the day in "forms," essentially underground burrows that hold the cool night air through the day. Birds and lizards reduce their activity in the daytime hours, and go out only very early in the morning or in the evening. The kangaroo rat seems to have come up with the ultimate in desert adaptations — it is able to make its own water from the seeds it eats.

The hottest, driest part of the Canyon is the Inner Gorge, the black rock that forms the walls enclosing the Colorado River. In this unstable environment, a few hardy plants like beavertail cactus and brittlebush cling to the steep slopes.

In the middle of this extreme heat and dryness are desert oases, permanent seeps and springs that surprise a visitor with verdant maidenhair fern and lovely crimson monkeyflowers and golden columbines. Along Canyon sidestreams in the spring, redbud trees bloom alongside cottonwood and hackberry. Only in these spots can amphibians, like the Canyon tree frog, and birds, like the Dipper, exist.

The Colorado River supports another community that has seen many changes since the construction of Glen Canyon Dam upstream in 1963. In the absence of heavy spring floods, a zone of willow and

tamarisk, an introduced species, has grown up along the river's edge. This new habitat hosts birds like Lucy's Warbler and Bell's Vireo, while beavers build lodges in the banks. Mice and skunks are commonly seen on the beaches.

Although plants are relatively stationary, animals can move from community to community. The Canyon in some cases acts as a barrier to this movement, and in other cases as a pathway. Migrating birds, for example, may use the Colorado River as a guiding line for their miraculous, long distance flights. For one type of squirrel, however, the Canyon has acted to block its dispersal. Two tassel-eared squirrels, the Kaibab and Abert, are found in the Canyon forests. Biologists think that at one time they were one species, but when the Canyon was cut their dependence on the ponderosa pine for food and nesting made it impossible for them to travel across the desert. The Kaibab squirrel is a rare animal, found only on the North Rim of the Grand Canyon. Its "cousin," the Abert, lives on the South Rim and in other pine forests in the Southwest. In appearance, the Kaibab is grey with a totally white tail. The Abert is white on its underside, but grey on top with a reddish-brown strip along its back.

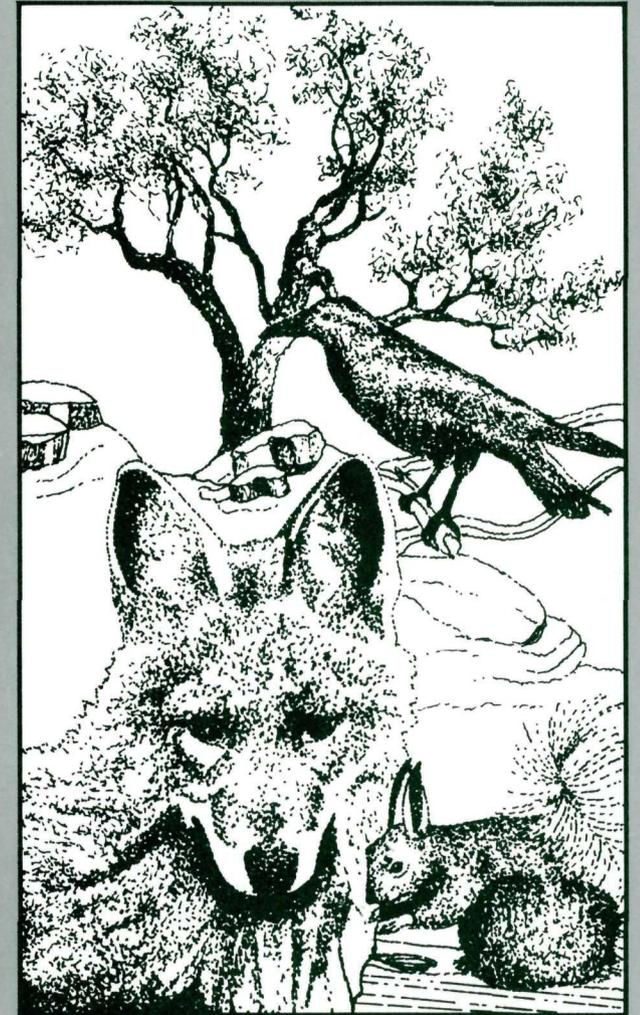
As caretakers of this natural treasure, we have a responsibility to assure that the diversity is preserved. It may be all that remains of untouched land for future generations to study — a place to learn what makes the mountain lion what she is.



Grand Canyon Natural History Association

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