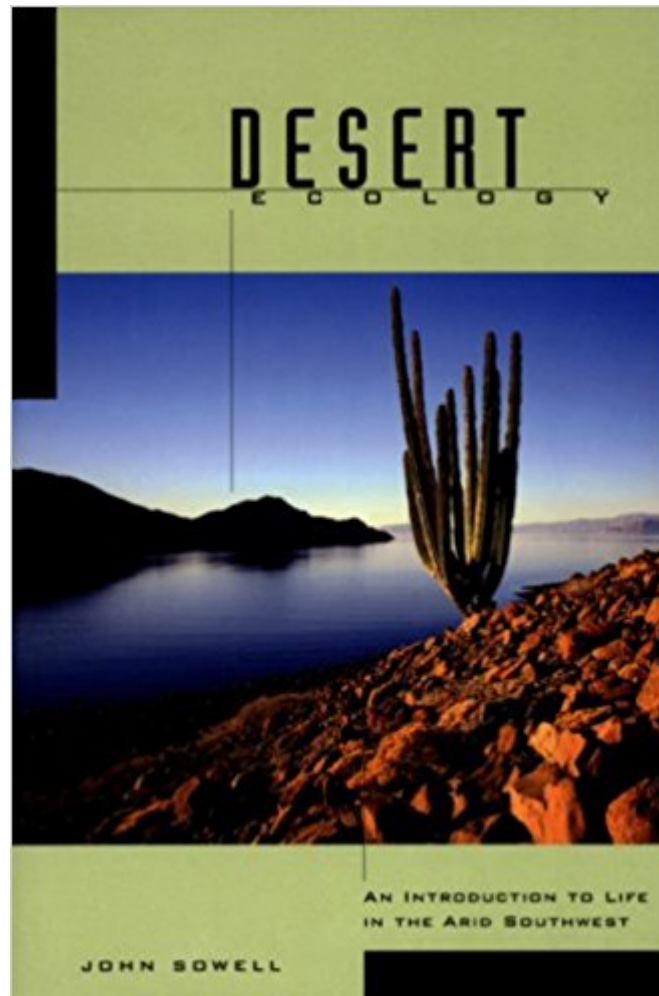




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# Desert Ecology



## Synopsis

Natural History"An energetic start quickly became a trudge; we glanced back frequently towards our point of departure, an air-conditioned vehicle. Not only did the hot air feel like a blast from a smelter's furnace, but within minutes the reflected sunlight was doing perceptible damage to any exposed skin. I'm sure I was sweating more than I ever had before, yet my skin was dry...We found ourselves blinking rapidly to keep the eyes moist. After a few more minutes, we turned back for the car, leading our youngest child who would no longer open her eyes."- John Sowell

Unlike books that merely identify what plants and animals live in the desert, *Desert Ecology* is a comprehensive but accessible introduction to how these organisms live where they do. Beginning with an overview of the Intermountain, Mojave, Sonoran, and Chihuahuan Deserts, Sowell presents the topographic and the meteorologic conditions that created these regions. He continues with a thorough examination of physiologic and behavioral adaptations that enable plants and animals, even humans, to survive and persist in these inhospitable places. While basic scientific principles such as photosynthesis, trophic levels, thermoregulation, and osmoregulation are presented in terms that nonspecialists will understand, the real draw is the fascinating life histories of dozens of particular organisms. Explore the life cycle of the yucca and creosote bush, trace the wanderings of the gila monster and tenebrionid beetle, breathe in the rhythms of the desert at night. "This book is for the curious," says the author, for all who enter the "wasteland," on foot or through imagination.

## Book Information

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## Customer Reviews

"This is a highly informative book, clearly and economically written. Buying it and learning from it would be part of a good adaptive strategy for us humans." — •Southwestern American Literature

John Sowell is professor of biology at Western State College in Gunnison, Colorado.

This small book, 6" X 9" and 192 pages, is organized into nine chapters. An opening chapter describes the general features of deserts, two chapters treat plants (adaptations to arid conditions, life histories), three cover animals (thermoregulation, osmoregulation, life histories), one discusses desert ecosystems (food webs, productivity), one describes desert mountains (the "sky islands" of the southwest), and one chapter discusses humans living in desert environments. This is a book worth reading if you are a novice to deserts and their ecology. It is largely well written, with a reasonable dose of "desert lore," some appropriate quotes, and good opening passages for each chapter. However, it treats the broad subject of deserts somewhat unevenly, and the writing could have benefited by some careful editing. The opening chapter, with which most authors would hope to "hook" their readers, is rather unpolished. It starts strong, with a vivid description of Death Valley. But then, little-by-little, the writing becomes rather cumbersome. The information is generally there, it just isn't always precise or easily extracted due to the uneven writing. Terms are used without definition (e.g., *playa*, *arroyo*), allusions are attempted that don't always work (e.g., "oceanic deserts"), and examples are sometimes confusing (e.g., the coastal chaparral of Baja California seems to be treated as a desert, even though the map of southwestern deserts clearly excludes it, as well it should be). The plant and animal chapters are probably the strongest, though showing a clear bias toward physiology over ecology and evolutionary biology. The coverage of plant physiology is excellent, and the discussion of CAM C-4 photosynthesis is (a difficult topic about which to write) is one of the clearest I've read. However, the discussion of halophytes is so superficial as to be of little use. The chapter on plant life histories is generally well done, although it is, again, rather uneven. Sometimes Latin names of plants are parenthetically provided, other times not; readers unfamiliar with names like "saguaro" and "cardon" may not recognize these as cacti. Given the unevenness of the text, a glossary would have made this book far more useful. It could also have benefited by inclusion of a table listing common and scientific names of the organisms mentioned. More maps also would have been a valuable aid for readers. The "Islands in the Sky" chapter devotes only 10 pages to these geologically and biologically fascinating ecosystems of the desert southwest, giving short shrift to what many regard as their most interesting attribute, the

evolutionary aspects of isolation on these montane "islands." This chapter also has a section devoted to "riparian corridors" which, in the desert southwest, has far more to do with the desert floor itself than with sky islands. The riparian corridors of southwestern deserts are the anchors and lifeblood of dryland ecosystems and biodiversity, and these critically important habitats deserved a chapter unto themselves. The final chapter is devoted mostly to human physiology, more of interest to the medically inclined than to readers with an interest in human ecology and how humans and environments interact. The BIG issue in the southwestern deserts is what humans have done to the landscape, and it's mostly about water and habitat conservation (especially riparian habitat conversion). The deeply important issues of conservation are largely glossed over when, in fact, they also deserved their own chapter. There is no bigger issue in the southwest today than water. Water is the ultimate limiting factor for humans as well as ecosystems in these drylands.

Approximately 23 million people live in the Lower Colorado River Basin that are largely dependent upon water from the Colorado River. By 2020 it is estimated that more than 38 million people will be living in this region. The population of the Sonoran Desert alone now exceeds 7 million people and has experienced a 7-fold population increase in the past 50 years, with a doubling between 1970 and 1990. This is the fastest growth and most massive land conversion in North America's history. There are no signs that this growth is tapering off. Nearly all of the rivers and riparian systems in North America's deserts have been severely altered, or destroyed. The combination of anthropogenic riparian destruction (including cattle grazing) and groundwater overdraft has profoundly impacted deserts and deserves to be treated in a book on desert ecology. The rich riparian forests that once criss-crossed the southwest are now rare, due to urban growth, agriculture, ranching, surface water diversion, and over-pumping of ground water. The development of powerful mechanized pumps in the 1920s led to massive groundwater overdraft in agricultural areas throughout the Sonoran Desert, and today the overdraft in this region averages 1.25 million acre-feet/yr . The massive Costa de Hermosillo (Sonora) irrigation district, for example, peaked at 887 pump-powered wells supplying ground water to more than 100,000 hectares of irrigated land, exceeding recharge rates by 250 percent. Due to plummeting water tables and saltwater intrusion, millions of acres of farmland have been permanently abandoned throughout northwestern Mexico and the American southwest. In the Sonoran Desert, about 60 percent of the native vegetation has been converted or destroyed, and nearly all of its rivers have been diverted or dried over the past century. In Arizona, only ten percent of the historic riparian habitat still survives. These landscape-scale changes in southwestern deserts have become an integral part of the region's ecological fabric and they cannot be ignored without giving false impressions.

Author does a good job discussing the many factors involved in desert life. General overview of biology, but the human aspect is not up to the level of the rest of the book.

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