



Population and conservation in the Sonoran Desert

FEW AREAS in North America can match the challenges to conserving the natural environment that have accompanied human population growth and development in the Sonoran Desert. The biological resources in this region comprise a broad array of plant and animal species, many found nowhere else in the world. But the threats to the survival of these resources are considerable, with population growth and development in the Sonoran Desert over the past half-century occurring at rates rarely matched anywhere on the North American continent.

Located in the states of Arizona and California in the southwestern United States, and in the states of Baja California and Sonora in northwestern Mexico, the Sonoran Desert covers about 222 700 square kilometers. As with all deserts, it receives minimal precipitation – as little as 100 millimeters annually in its driest sections. But despite this aridity, the Sonoran Desert contains remarkably high biological diversity. Available evidence indicates the presence of about 130 species of mammals, 20 of amphibians, nearly 150 of reptiles, about 25 of fish, and at least 500 species of birds. Plant diversity is marked as well; the state of Sonora alone contains at least 20 percent of Mexico's plant species. In terms of the number of life forms and the variety of ecological communities, the Sonoran has been called the richest desert in North America.

As often is the case, the species in the Sonoran Desert that has come to dominate all others is human beings. Human occupation began about 11 000 years ago, when prehistoric hunter-gatherers entered the region. Although some indigenous peoples eventually developed elaborate irrigation systems, providing an adequate agricultural foundation for sedentary settlements, total population in the Sonoran Desert remained of the order of a few tens of thousands until European contact in the 16th century. For several reasons, most notably its remote location and its arid natural environment, population grew slowly during the ensuing four centuries of Hispanic and Anglo-American occupation. But late in the 19th century, the connection of this remote region to other areas by road and rail, and the emergence of large-scale projects to control water, provided the foundation for considerable population growth. This growth began in earnest after the Second World War. By 1970 the population of the Sonoran Desert had reached nearly 2.3 million people and was growing at a rate in excess of 4.0 percent annually; by 1995, regional population was nearly 5.5 million, and still growing at a rate of 3.0 percent per year.

The vast majority of current population in the Sonoran Desert occurs in and around urban areas. Some cities have grown quite large. For example, in the Mexican portion of the region, the cities of Mexicali and Hermosillo both currently contain more than half a million people, while in the United States portion of the region, metropolitan Phoenix contains about 2.5 million people and metropolitan Tucson another half-million. In 1990, the most recent year for which we have reliable data for the entire region, more than 88 percent of the Sonoran Desert's inhabitants lived in 40 communities containing 10 000 people or more. Although concentrated population tends to concentrate impacts to the natural environment, in the Sonoran Desert sprawl serves to disperse impacts

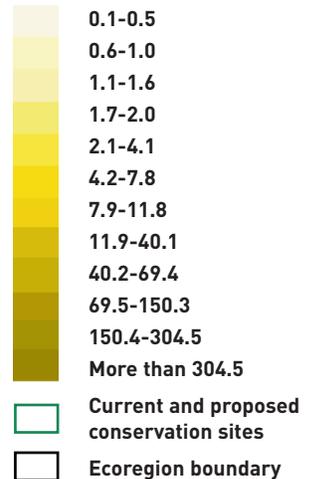
around the urban centers. Moreover, the modern technology that has enabled the development of large concentrations of population also serves to deplete surface and subsurface water supplies far beyond the geographic limits of these cities, causing enormous environmental impacts.

Although an excess of births over deaths has contributed to the population increase in the Sonoran Desert, the majority of population growth has been due to migration. Between 1985 and 1990, for instance, in several United States counties and Mexican *municipios* in the region more than 20 percent of the population aged five years and older had relocated from another state or country – the total for the desert in excess of 650 000 in that short period alone. The reasons for this high rate of migration vary between the two countries, but seem to share a common foundation in economic opportunity. In the Mexican part of the Sonoran Desert, many people have relocated from other parts of the country to areas close to the border to take advantage of potential employment – primarily to work in manufacturing plants called *maquiladoras*, and to a lesser extent to work in the Borderlands cities and in coastal resorts. In the United States portion of the region, growth in the Sonoran Desert has been part of a larger phenomenon of growth throughout the Sun Belt, a combination of relocation for retirement coupled with economic growth in manufacturing, the tourism industry, and to support the growing population of retirees.

A recent conservation plan developed by The Nature Conservancy and partner organizations identified 100 landscape-scale conservation sites and about 30 smaller conservation sites in the Sonoran Desert. Many of these sites are in areas of sparse population and minimal population growth. Others, unfortunately, lie in areas of dense and growing population, or in the path of likely growth. What the future holds for these sites depends in large part on the direction of future population change and development and, in particular, on efforts to guide development in a way that uses scarce resources wisely and minimizes the damage done to the natural environment.

POPULATION AND CONSERVATION IN THE SONORAN DESERT REGION, 1990

Population density per square kilometer



Source: US Bureau of the Census; INEGI.

