QUENCHING THE THIRST FOR KNOWLEDGE

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Western visitors, whether from Europe or the eastern United States, looked upon the West as a "desert"—a place without water where a man and his horse could die of thirst. So ominous was the prospect of running out of water that an early explorer of the Sonoran Desert named W J McGee penned an essay on "Thirst as a Disease." So ingrained within our culture was this need for water that we failed to appreciate that animals who lived in the desert had obviously solved the thirst problem.

Humans, meddlers that we are, immediately set out to alleviate this lack of water for both altruistic and practical reasons. Water developments were necessary, not only for us to remain in one place, but to farm and raise livestock. So it was that no one even thought to question whether those animals that lived in the desert also needed more water. That was a given. All one had to do was observe the birds, bees and other animals that flocked to the waters that we developed. Provide water, it was reasoned, and they will come—and, it was also reasoned, increase and multiply.

As a young Wildlife Manager, who came to Arizona in 1961, I was no exception. I recommended the construction in my district of numerous water catchments, game guzzlers we used to call them. The hope and expectation was that bighorn sheep, deer, doves and quail would benefit by having a dependable water source. Of this, there could be no doubt. All one had to do was observe the creatures that came to these developments. I remember counting well over 100 desert mule deer during a June night in the Picacho Mountains in southern Arizona.

I, like nearly everyone else, never questioned the desirability of providing water. Never mind that desert animals such as kangaroo rats, pack rats, and ringtail cats manufacture metabolic water and are able to subsist without us providing them with this essential compound. That earlier studies by the Arizona Game and Fish Department had showed that quail used water developments, and that the presence of water affected their distribution, was reason enough to build more guzzlers. Never mind that these "improvements" did not increase quail numbers. That the rise and fall of quail populations was determined by vitamins, not water availability, was only what has come to be known in today's parlance as "an inconvenient truth." Nor did developing more waters increase dove populations. Isolated windmills that formerly quenched the thirst of thousands of whitewings, when supplemented by more wells, were now only visited by hundreds of these birds.

Large mammals were something else, however. It only stood to reason that water was limiting not only their distribution but their numbers. If water allowed mule deer, bighorn, or javelina the use of a formerly waterless area, that was reason enough. By merely making waterless areas available, we could increase their numbers. Indeed, populations of deer and sheep, at least in some areas and in some years, increased. Unfortunately, designed experiments to measure any numerical changes were lacking

But disappointment is the desert's constant companion. Droughts came and big game populations plummeted—with or without the presence of water. Studies by Arizona Game and Fish biologists showed that, while pronghorn fawn recruitment was significantly associated with water availability they found forage availability to be more important. Wildlife managers despaired. Of what use was water without sustenance? Gradually a truth became apparent. Water alone would not suffice. Without nutritious forage, animals, no matter how desert adapted, could not survive and reproduce. Without rain, nothing grows. When nothing grows, animals die. It was time to take a look at all of the limiting factors that the desert had to offer.

What characterizes a desert is not only the paucity of rain, but the erratic nature of it... It has always been so. Animals in Africa and Asia have been adapting to desert conditions for millions of years. In North America, desert animals have been evolving with drought since Miocene times, ca. 18 million years ago. Some of these adaptations are

physiological, others behavioral. To understand how animals cope with drought, we first need to understand how these adaptations function. Then, and only then, may we perhaps be able to benefit those animals we choose to assist.

So how do animals cope with periodic bouts of prolonged drought? To do so requires the ability to survive a worst case scenario. Smaller animals spend the heat of the day underground. Larger animals develop nomadic or migratory behavior and some such as camels and wild burros drink and store copious quantities of water. Others, such as the pronghorn antelope of North America conserve fluids by reducing the moisture content of their waste, by having a light, reflective color, and by aligning their gracile form perpendicular to the sun. Even more advantageous is the species ability to cool the brain and other vital organs with special blood vessels. Surprisingly, pronghorn in desert areas often forgo drinking, preferring instead to obtain their moisture from succulent cacti.

Pronghorn may also possess other methods of combating thirst. A look at the present distributions of pronghorn in the Sonoran Desert shows that the only populations remaining reside within 150 km of the ocean. All of these populations, along with the also native bighorn, subsist without free water. When water is provided to free ranging pronghorn, few drink it. One theory is that they obtain water by ingesting early morning dew. Another is that they feed at night when the water content of plants is higher.

Merely providing water is clearly not an answer. More knowledge is required to determine if we can maintain low densities of pronghorn and other large desert animals during drought events—episodes that appear to come with increasing frequency. Fortunately, answers may be on the way. Biologists such as John Hervert in Arizona and Jorge Cancino in Mexico are determining whether irrigated food plots can allow pronghorn to survive droughts. Melanie Tluczek in Arizona and Alice Koch in California are investigating the animal's nighttime feeding habits. Hopefully, their quests will result in a better understanding of the animal's water balance needs before it is too late.