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Source: BioScience, 57(4) : 317-320

Published By: American Institute of Biological Sciences

URL: https://doi.org/10.1641/B570404

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The Sonoran pronghorn, one of five pronghorn subspecies, may be the most endangered large mammal in the United States. Once ranging more widely, today they are found in the United States only on protected lands in southwestern Arizona. Captive breeding programs and desert enhancements are starting to revive Sonoran pronghorn numbers.

Michael Coffeen looked on last fall as the gates of a wire-mesh pen deep in the Sonoran Desert in Arizona swung open. Inside, two Sonoran pronghorn cautiously eyed the open door. First one, and then a few minutes later the other, exited the holding facility at Cabeza Prieta National Wildlife Refuge west of Ajo. They dashed past tall saguaro cacti, darted around stately palo verde trees, and disappeared beyond ubiquitous creosote bushes into the vast desert.

Two months later, the two yearling males not only were still alive but had joined herds of wild Sonoran pronghorn. One was even seen in the company of a wild female. Their release, says Coffeen, a US Fish and Wildlife Service (FWS) biologist and team leader for Sonoran pronghorn recovery, "moved us one step closer to restoring a free-roaming US population."

Indeed, those youngsters were the first captive-born Sonoran pronghorn to be released to the wild. Their release represents an important step in the recovery of

Two Sonoran pronghorn, each wearing a radio collar, watch warily from the captive breeding pen at Cabeza Prieta National Wildlife Refuge. Behind them lies typical Sonoran Desert thorn scrub, with a tall saguaro cactus in the distance. The captive breeding and desert enhancement program for Sonoran pronghorn was modeled after a similar program to save the peninsular pronghorn in Baja California, Mexico. Photograph: Allen Zufelt, Arizona Game and Fish Department.

Nets are fired from helicopters to capture wild Sonoran pronghorn for captive breeding in the United States or for attaching radio collars for study in the wild. Note the open terrain, which pronghorn prefer so they can see approaching predators. Also note the sandy soil, which reduces the chances of injury when the pronghorn are netted. Photograph: Allen Zufelt, Arizona Game and Fish Department.

a population that almost went extinct a few years ago. It also shows that, despite some initial concerns, intensive management could help revive the Sonoran pronghorn's prospects.

Pronghorn particulars

Pronghorn (*Antilocapra americana*) are the fastest land animal in North America and the world's second fastest after the cheetah. They once inhabited prairies, dry scrub, and deserts from Saskatchewan, Canada, south to Chihuahua, Sonora, and Baja California, Mexico, and from the Rocky Mountains west to California. They numbered an estimated 30 million in the early 19th century, second only to bison in North America. By 1915, however, their numbers had dropped to about 1500 from overhunting and habitat loss. Now their population totals nearly one million.

The Sonoran pronghorn (*A. americana sonoriensis*) is the smallest of the five recognized pronghorn subspecies. Often confused with goats, antelope, and deer, pronghorn actually are none of the above. Instead, they belong to a family of North American mammals that, except for the pronghorn, went extinct millions of years ago. Unlike deer, pronghorn have forked horns made of keratin, not antlers, which are bone. Unlike antelope, pronghorn shed their horns' outer sheaths annually. And, unlike goats, pronghorn horns are solid, not hollow inside.

The Sonoran subspecies of pronghorn originally ranged from southeastern California and southwestern Arizona into Sonora in Mexico. Although nobody knows for sure, they probably numbered in the thousands in the United States alone. Now they are found in the United States only at Cabeza Prieta National Wildlife Refuge, Organ Pipe Cactus National Monument, Barry M. Goldwater Range, and other federal lands in southwestern Arizona. In 1967, when the Sonoran pronghorn was reduced to a few hundred, the FWS listed the species as endangered in the United States. Another 640 roam the terrain on the Pinacate Biosphere Reserve and east of Puerto Peñasco in Sonora.

Pronghorn have suffered from fences, roads, railroad tracks, and other human developments that break up their habitat, cut them off from sources of food and water, and make them vulnerable to hunters. Unlike deer, pronghorn rarely jump fences and are reluctant to cross roads. Shy, nervous animals, they avoid people, once again limiting their available habitat. And cattle, now gone from federal lands in southwestern Arizona, once ate the sparse grasses, forbs, and other plants that pronghorn depend on, thereby shifting the desert's vegetation mix to less palatable plants.

Drought hit the Sonoran Desert in 1996, following a decade and a half of mostly good rainfall. That drought has

lasted, more or less, for over a decade. From a population of nearly 200 in the mid-1990s, the number of Sonoran pronghorn fell to between 20 and 25 by 2002—the worst drought year on record in southern Arizona.

Although adapted for desert dwelling, Sonoran pronghorn need adequate rains, especially in the summer, says John Hervert, an Arizona Game and Fish Department (AGFD) wildlife biologist. If summer rains do not come, green plants turn gray as they dry out, pregnant and nursing mothers go hungry, and few if any fawns survive. Fawn survival is needed to replace the 10 percent of adults killed on average every year by predators, disease, and other causes.

Management

For years, wildlife biologists and conservationists debated how to preserve Sonoran pronghorn, says John Morgart, an FWS biologist in Albuquerque and former pronghorn team leader. Some proposed a more hands-on management approach to include captive breeding, water provision, and habitat enhancement. Others countered that Sonoran pronghorn should be left alone, that they got all the water they needed from the plants they ate, and that, since most of Cabeza Prieta (93 percent, or an area larger than Rhode Island) is designated wilderness, it should be left natural.

With the US Sonoran pronghorn population on the verge of extinction in 2002, those concerns began to crumble. "We knew we had to do something," recalls James deVos, a retired AGFD wildlife biologist who spent years studying Sonoran pronghorn. 'There were no other good options left," adds Sandy Bahr, conservation outreach coordinator for the Sierra Club's Arizona chapter. "Captive breeding...was essential for their survival."

Working with biologists from Mexico's federal and state wildlife agencies, FWS and AGFD officials launched a short-term emergency program to restore Sonoran pronghorn numbers in the wild. Key to that effort was a decision to capture Sonoran pronghorn, breed them in captivity at Cabeza Prieta, and release their offspring to the wild in the United States. Cabeza Prieta was chosen as a breeding facility because of its wild, isolated character and because pronghorn are too wary of people to breed in zoos. To diversify the US population's gene pool, some pronghorn from the more numerous Mexican herds were to be captured and moved to the breeding facility. The two herds are effectively isolated from each other by the east–west Mexican Highway 2, just south of the border.

Captured Sonoran pronghorn are sedated, blindfolded, and promptly transported by helicopter to Cabeza Prieta to avoid the deaths associated with capture myopathy that plagued the program's early days. No deaths have occurred since the first captures. Photograph: Erin Fernandez, US Fish and Wildlife Service.

Catching Sonoran pronghorn for captive breeding or to attach radio collars for study proved difficult. Five died during initial attempts, one from a broken neck suffered during capture in Mexico, and four from capture myopathy, which causes the animals to overheat and their hearts to fail. "We've learned a lot since then," Coffeen says. Now, the biologists sedate captured animals, cool them with water, and net animals only when the temperature is 80°F (27°C) or less. They also transport each captured pronghorn individually by helicopter to get it to Cabeza Prieta quickly.

In 2004, 14 Sonoran pronghorn were captured, including 6 from Mexico, and brought to Cabeza Prieta. They have produced 20 fawns, 10 in 2005 and 10 in 2006, of which 6 and 9, respectively, are still alive. The two pronghorn released to the wild in November 2006 were yearlings. At least two more captive-born pronghorn are slated for release later this year. The biologists hope to eventually release 20 a year.

Further, FWS and AGFD biologists have created "habitat-enhancement" plots in the desert. Generators pump water from wells dug at three locations at Cabeza Prieta and two on the Goldwater Range. The water irrigates six- to eight-

Visit these Web sites for more information:

Defenders of Wildlife: *www.defenders.org/wildlife/pronghorn/overview.html*

US Fish and Wildlife Service fact sheet: *www.fws.gov/southwest/refuges/arizona/pronghrn.html*

North American Pronghorn Foundation: *www.antelope.org*

México Desconocido Online—Saving the Pronghorn Antelope: *www.mexicodesconocido.com.mx/english/naturaleza/fauna/detalle.cfm?idpag=1721&idsub=35&idsec=11*

acre (2.4- to 3.2-hectare) plots in areas frequented by pronghorn, causing seeds dormant for years to germinate. The result, says Coffeen: Females have plenty to eat, thus ensuring that more fawns survive each year.

Additionally, FWS, AGFD, and National Park Service (NPS) researchers found that pronghorn drink water when it is available rather than rely exclusively on plants for moisture. The biologists have built water tanks at seven spots in Cabeza Prieta, four at the Goldwater Range, and one at Organ Pipe. Some tanks are filled with water pumped from underground wells, and others are placed where runoff from desert rains can fill them. Occasionally, Coffeen says, the AGFD uses helicopters to fly water to the remote tanks.

Cause for hope

These efforts have paid off, although not as much yet as hoped. A December 2006 survey found 68 wild Sonoran pronghorn in the United States. Biologists had expected to find more than 80, says Timothy Tibbitts, an NPS wildlife biologist at Organ Pipe. In the future, biologists plan to establish new herds, using captive-born releases or translocated wild pronghorn, in areas of Arizona and Mexico they once frequented.

Increased numbers do not mean the Sonoran pronghorn is out of the woods. One concern remains weather. While the drought eased from 2003 to 2005, it returned in 2006—perhaps one reason biologists did not find more animals, Coffeen says. Some experts worry that global warming may make the desert even drier.

Another concern is money. Habitat enhancement sites alone cost $450,000 to build, and the captive breeding facility cost another $200,000. The program's annual budget totals $400,000, divided among eight federal and state agencies. How long those agencies can continue to fund the pronghorn program remains unclear. Even more worrisome is the flow of illegal immigrants and drug smugglers—as well as the US Border Patrol agents who chase them—through Organ Pipe and Cabeza Prieta, further disturbing the nervous pronghorn and separating them from some sources of food and water.

Nevertheless, wildlife biologists remain hopeful. "I'm guardedly optimistic" about the Sonoran pronghorn's chances, says deVos. "The outlook for them is certainly better today than it was 10 years ago." Hervert agrees. "This is a unique subspecies of a unique species," he says. "We have to bring them back."

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doi:10.1641/B570404
Include this information when citing this material.