



Wildlife Field Notes

Don't Fence Me In

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Introduction and Design Considerations

Studies by the Arizona Game and Fish Department's (AGFD) Wildlife Contracts Branch have shown that fenced roadways form almost complete barriers to pronghorn movements and contribute to pronghorn habitat fragmentation. Habitat fragmentation, caused by roads, canals, fences, and human developments of all kinds, is a known factor globally in animal population declines and undoubtedly contributes to pronghorn declines in Arizona. In the 1990s, AGFD researchers theorized that roadways closely flanked by right-of-way fences were pronghorn movement barriers. It was hypothesized that pronghorn could not cross the fence-road-fence combination when all three obstacles were in proximity. However, if the fences were moved away from the roadway, creating a "staging space" between the obstacles and providing pronghorn time to negotiate those obstacles, the combined barrier effect would be negated or minimized and pronghorn could safely cross the road (Figure 1). Without the away-from-the-road staging

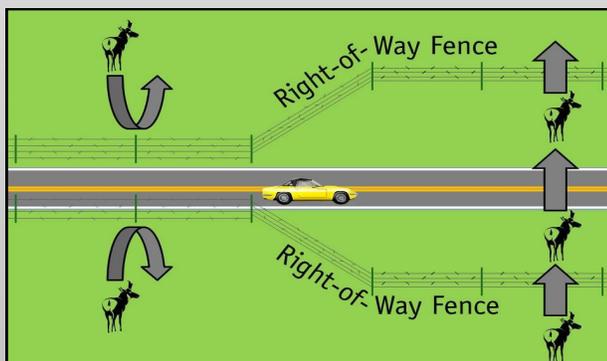


Figure 1. Schematic showing fences moved back to allow pronghorn to stage before crossing the road.

space, pronghorn refuse to cross or get alarmed by approaching traffic and bounce back and forth from fence to fence across the road, resulting in collisions and mortalities.



Figure 2. Because pronghorn almost always go under fences, characteristics such as a smooth bottom wire are important.

In addition to the staging space, the type of fence along the roadway is also important. Although pronghorn are fleet animals, they rarely jump fences. They evolved in open grasslands with no barriers to jump and escaped danger by detecting it through keen eyesight and then simply out-running the threat. Today, when pronghorn come to a fence, they almost never jump it but, instead, go under the bottom wire, if they can. So the type and design of the fence is important to the ability of pronghorn to pass under it. Studies have shown that the bottom wire should be at least 18 inches from the ground and is best if smooth and not barbed.

Roadway fences are not the only fences that fragment pronghorn habitat; pasture fences erected in

wide open grasslands for livestock management, and to denote private property boundaries, are also barriers to their movement. The worst kind of fence for pronghorn is that of woven wire. This type of fencing has traditionally been used in the sheep industry, but many other pasture fences have barbed bottom wires that are less than 18 inches off the ground. These fences are generally impermeable to pronghorn. Furthermore, coyotes have learned to herd pronghorn into these impermeable fence corners for easier predation.

Study Methods

Working with Wupatki National Monument, AGFD Contracts Branch biologists were able to remove right-of-way fences along US 89 within the Monument's boundaries. This was due to the fact that Monument perimeter fences kept livestock out of the Monument and, therefore, off of the road.

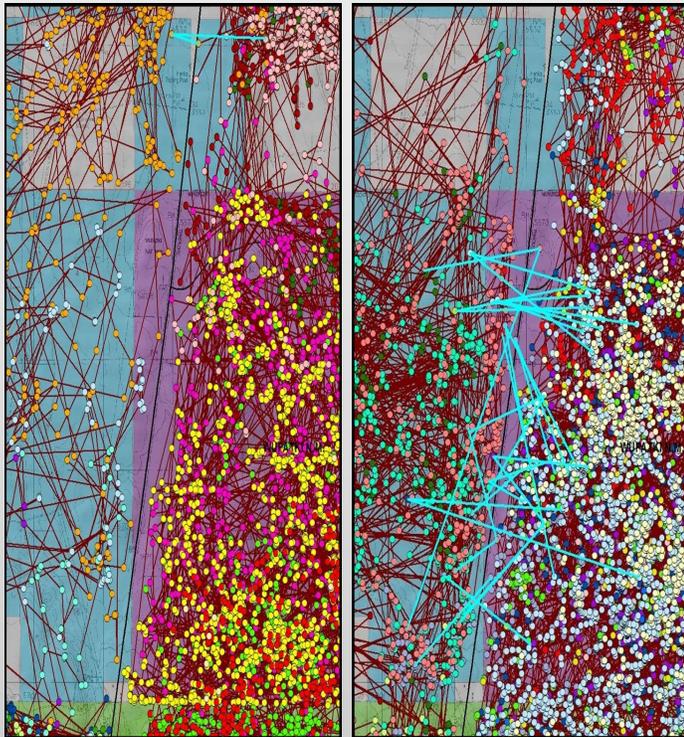


Figure 3. Map of US 89 through Wupatki National Monument showing only one pronghorn crossing when roadway fences were up (left) and numerous pronghorn crossings when fences were taken down (right).

Results

Before fence removal, only one of 37 marked pronghorn had crossed the road. After removal, nearly half of the marked pronghorn crossed the road, supporting the hypothesis that roads and their immediately adjacent right-of-way fences fragment pronghorn habitat and that by removing these fences, or by creating a staging space between them and the roadway, the barrier effect is negated (Figure 3).

Recommendations

AGFD biologists have shared the results from the Wupatki National Monument experiment with the United States Forest Service and the Arizona Antelope Foundation, as well as with other agencies, organizations, and volunteer groups, all of whom have contributed to the fence removal experiment. Treatments now include moving fences away from roadways, removing or modifying pasture fences by replacing barbed bottom wires with barbless wire set at 18 inches from the ground, and adding “goat bars” (Figure 4) that visually indicate a location where pronghorn can cross under a fence. AGFD biologists are currently in the process of outfitting more than 60 pronghorn with GPS collars to assess the effectiveness of these new fence modifications and will share the results in a future Field Notes.



Figure 4. Raising the bottom wire of a fence and covering it with a “goat bar” facilitates pronghorn movement.

Special thanks to Arizona Antelope Foundation, Arizona Department of Transportation, Babbitt Ranches, U.S. Forest Service, Wupatki National Monument, Charles Hofer, Richard Ockenfels, and many volunteers.

For more information on this and other projects, visit www.azgfd.gov/contracts