



# Assessing Restoration Success

## *Pronghorn Movement Behavior and the Short Game*

Article by

ERIN C. O'CONNELL, JUSTIN T. FRENCH, CARLOS E. GONZALEZ, LOUIS A. HARVESON *Borderlands Research Institute*,  
SHAWN S. GRAY *Texas Parks and Wildlife Department*, L. CODY WEBB *Rocker b Ranch*

Photo by Erin O'Connell



Two translocated does on the Rocker b Ranch in west-central Texas.

Pronghorn are native to the grasslands of Texas and are a charismatic big game species in the Trans-Pecos. Pronghorn once occupied nearly all of Texas, however their range is much smaller today, in part due to drought, restrictive fencing, and human expansion, all of which contribute to habitat loss.

In 2011, Texas Parks and Wildlife Department (TPWD) began a tremendous long-term program to restore pronghorn in the Trans-Pecos, partnering with Borderlands Research Institute (BRI), Texas Parks and Wildlife Foundation (TPWF), landowners, and other conservation organizations to monitor and learn from these efforts.

Restoration efforts are complex and challenging to implement, particularly when animals must be moved from surplus populations to augment declining ones, a process known as translocation. Identifying viability of source populations, determining suitability of recipient habitat, and implementing safe, humane capture and transport procedures are all substantial undertakings. As a result, there is a considerable research focus on planning and implementing translocations.



Respect Big Bend

PARTNERING TO CONSERVE FAR WEST TEXAS



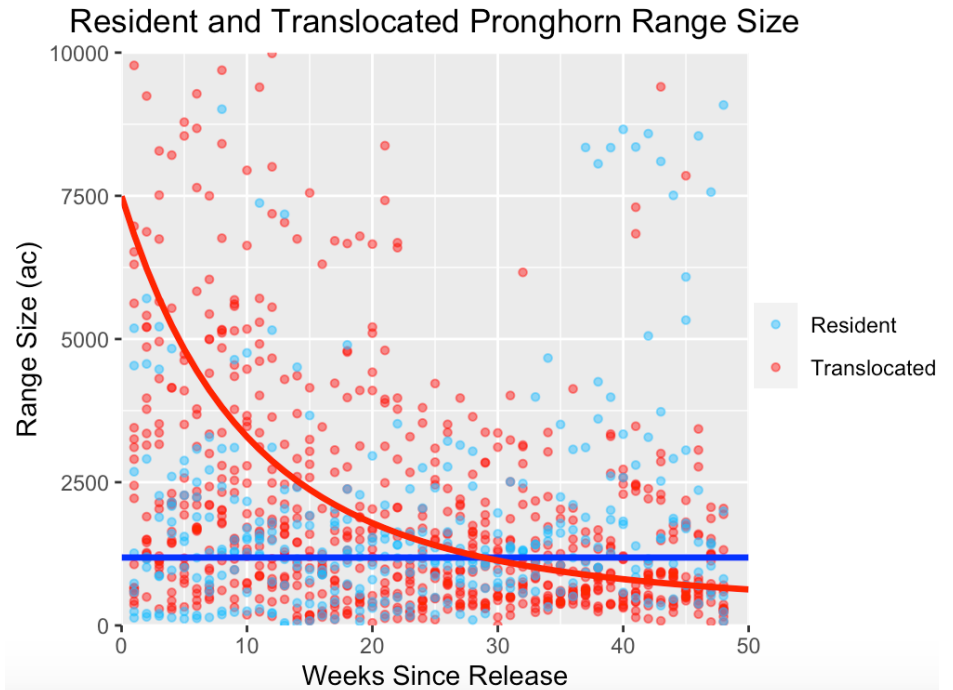
However, a translocation doesn't end when the animals are released from the trailer. While TPWD and BRI are devoting significant time and resources to monitoring pronghorn post-translocation, there is little to go on when deciding whether or not the effort was a success. Such assessments require specific, measurable, and biologically justified benchmarks, though these remain elusive in the scientific literature.

Measures such as post-release survival or subsequent population growth are obvious starting points but must be assessed over a meaningful timeframe. Some of these measures make sense in the short term, while others take longer to assess in a meaningful way. Without a biological reason for defining when to measure aspects of success, we are really just navigating in the dark. We asked the pronghorn, via post-release GPS monitoring, to illuminate our way forward.

The process of acclimation is gradual and influences an individual animal's movement pattern. A newly released pronghorn will move differently than a resident. In an unfamiliar environment, a pronghorn must learn where to find food, water, cover, and other pronghorn, so they will expend more energy and time exploring.

This leads to larger range sizes initially. However, moving across a large range is energetically costly and risky. As they acclimate to their new environment, find suitable habitat, and familiarize themselves with available resources and passable fences or fence modifications, pronghorn settle into smaller areas that meet their needs and reduce the risks of moving through unfamiliar territory. Thus, we can determine how long it takes pronghorn to acclimate by watching how their range sizes shrink through time.

On the far western edge of the Edwards Plateau, the Rocker b Ranch has a history rich with pronghorn. Located just north of Barnhart, Texas, the Rocker b was a source for stock pronghorn for relocation projects throughout the state in the 70s, 80s, and 90s. However, woody shrub encroachment on the ranch degraded the open grassland habitat that pronghorn require.



Pronghorn range sizes (acres) through time. Each point corresponds to an individual resident (blue) or translocated (red) pronghorn's weekly range size. Initially, translocated pronghorn have large range sizes (>7,500 acres) whereas residents maintain stable range sizes across time.

Over the last several years, the ranch has undertaken extensive habitat restoration efforts to remove the encroaching mesquite and shrubs. To increase connectivity within the pastures, the ranch made 200 fence modifications prior to translocation.

In February 2019, 20 resident pronghorn from the Rocker b were collared to serve as controls to compare with the translocated pronghorn in our study. Then, in January 2020, 110 pronghorn from Pampa, Texas, were translocated to the Rocker b and 44 adult females were released with GPS collars. We used the data from these collars to watch how translocated pronghorn range sizes changed through time, and to compare them to those of resident animals.

We found that translocated pronghorn ranges were large immediately post-translocation, averaging 7,500 acres. Resident and translocated range sizes were similar by 27 weeks and began to level off, indicating acclimation takes approximately six months.

This finding suggests acclimation takes considerably longer than the previous

working hypothesis of three weeks. Further, translocated ranges continued to shrink after acclimation, though much more slowly than before. Ultimately, translocated pronghorn ranges were 650 acres smaller on average than those of residents a year after release.

This was surprising, as we initially expected translocated pronghorn to learn from and absorb into resident groups. However, reality turned out to be more complicated and revealed an important difference between resident and translocated pronghorn.

Pronghorn strongly rely on their memory of the landscape, what we call a cognitive map, to choose habitat. We thought that translocated pronghorn would learn from residents to develop their cognitive map, benefiting from the residents' experience. Instead, we found that translocated pronghorn readily crossed modified fences and moved freely throughout the ranch, whereas residents, by and large, did not.

The memory of past restrictions still limited resident animals' use of the



Photo by Erin O'Connell



A pronghorn buck stands next to an unmodified section of fence on the Rocker b Ranch. Two hundred sections of fence on the ranch were modified to allow for pronghorn movement. We found that translocated pronghorn readily crossed modified fences, whereas residents, by and large, did not. The memory of past restriction still limited resident pronghorn's use of the landscape.

landscape. This is of great concern to biologists and managers because, without connectivity across the ranch, it is increasingly difficult to increase pronghorn populations with physical barriers like fences preventing movement. In this situation, the naivety of translocated pronghorn toward fences is advantageous as they are not restricted to one pasture.

This allows them to be more selective, better balancing the energetic costs and risks of moving more to find resources. This also allows them to colonize areas beyond the limits of the resident population, expanding the species' range in the state. Somewhat ironically, naivety turns out to offer a management benefit for pronghorn restoration. Translocated pronghorn might be able to teach the residents something new about finding greener pastures.

What does this tell us about assessing translocation success? It tells us that the short term is longer than we thought. Short-term metrics like post-translocation survival should be measured when the exploratory behavior has waned and risk of mortality is no longer elevated by exploratory behavior; conservatively, 6.5 months after release.

Ultimately, this research provides a timeframe with a biological basis by which to assess short-term success of translocations, but it is just one piece in a larger puzzle to establish criteria for evaluating success of translocations. Longer-term assessments, such as population growth targets, require their own temporal benchmarks that depend on other processes.

With continued monitoring, we will learn more about how pronghorn and pronghorn populations work. In doing so, we will find similar biological guidelines for setting assessment timelines of long-term metrics for restoration projects.

As we said before, translocation doesn't end when the animals leave the trailer. Continued monitoring, in both the short and long term, are the key to determining the success of these efforts. We are grateful to our partners at TPWD, TPWF and the Rocker b Ranch for their commitment to the success of Texas pronghorn. 🌟

 An advertisement for Blue Badge Land Services. The top left features a circular logo with a pronghorn head and the text "BLUE BADGE EST. 2021 SERVING THE HILL COUNTRY LAND SERVICES". Below the logo is a photograph of a yellow skid steer loader in a field with cacti. To the right of the photo, the text reads:
 

**BLUE BADGE  
LAND SERVICES**

**SPECIALIZING IN  
CUSTOM FORESTRY &  
BRUSH MANAGEMENT**

- LAND CLEARING
- CEDAR REMOVAL
- MULCHING
- PUSH & PILE
- SHREDDING

512.755.9864  
bluebadgelandservices@gmail.com  
@bluebadgelandservices  
bluebadgelandservices.com