

Introduction

South African oryx (*Oryx gazella gazella*) were introduced to New Mexico in 1969 and have become ubiquitous in our 5,000-ha study area¹. Patterns of oryx presence in our cattle breed comparison study at Chihuahuan Desert Rangeland Research Center (CDRRC)² near Las Cruces, NM, and how they might affect livestock grazing research and the pastures themselves have not been determined.

Objectives

- Describe oryx distribution across our study pastures
- Examine potential oryx grazing impacts to study pastures
- Quantify percent and types of forage consumed by wildlife

Methods

By reviewing published literature on oryx diets and habits in their native and introduced ranges we are able to infer what potential impacts they may have to Chihuahuan desert rangeland.

We tallied images from 40 camera traps paired with vegetation transects throughout the study area (Fig. 2). Forage utilization data were gathered by measuring stubble height of perennial grasses in two key areas per pasture during cattle grazing in 2020 and after two years of cattle absence in 2022. Pastures are mainly shrub invaded grasslands dominated by *Prosopis glandulosa*, with native perennial grasses and forbs in the understory and interspaces.

We used ESRI ArcGIS 10.1 to map Oryx counts at each transect and represent it with a tessellation to assign each camera and vegetation transect an area and color showing days oryx were present at that location during the study period.

Findings from Literature

Oryx are opportunistic feeders which adapt their diet to seasonal forage quality and daily water content. By grazing grasses at night when water content is highest or by selecting forbs with high water content they can meet their water requirements (~7L/day) and rely less on drinking water³. Oryx in the Kalahari forage primarily on grasses with crude protein contents >15% (*Enneapogon desvauxii*, *Sporobolus ioclados*) during the growing season, but dry season diets consist mainly of dicots and poorer grasses (*Eragrostis spp.* and *Urochloa spp.*)⁴.

The oryx population of NM occupies a mixture of ecological sites including grassland habitat shared with pronghorn⁵ and woodland habitat shared with mule deer⁶. In both types of habitat researchers have found potential for diet overlap and competition with livestock and with native ungulates, especially during drought^{5,6}. This could significantly increase grazing pressure on key native forage species such as *E. desvauxii* and may exacerbate shrub encroachment⁷.



Fig. 1: Trail camera (above) and Oryx image (left)

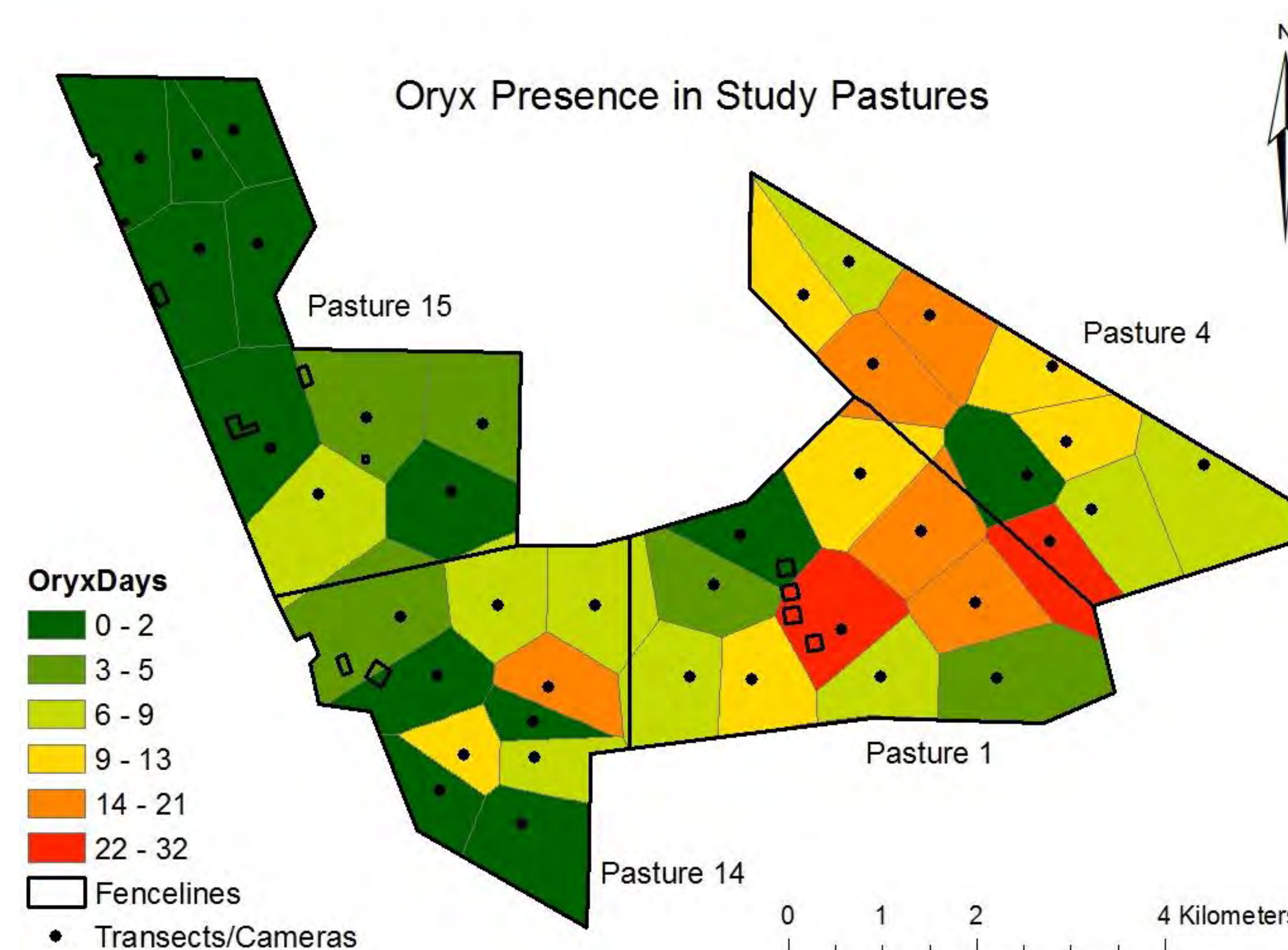


Fig. 2: Experimental pastures and tessellation of total Oryx counts at each of 40 transects showing general distribution.

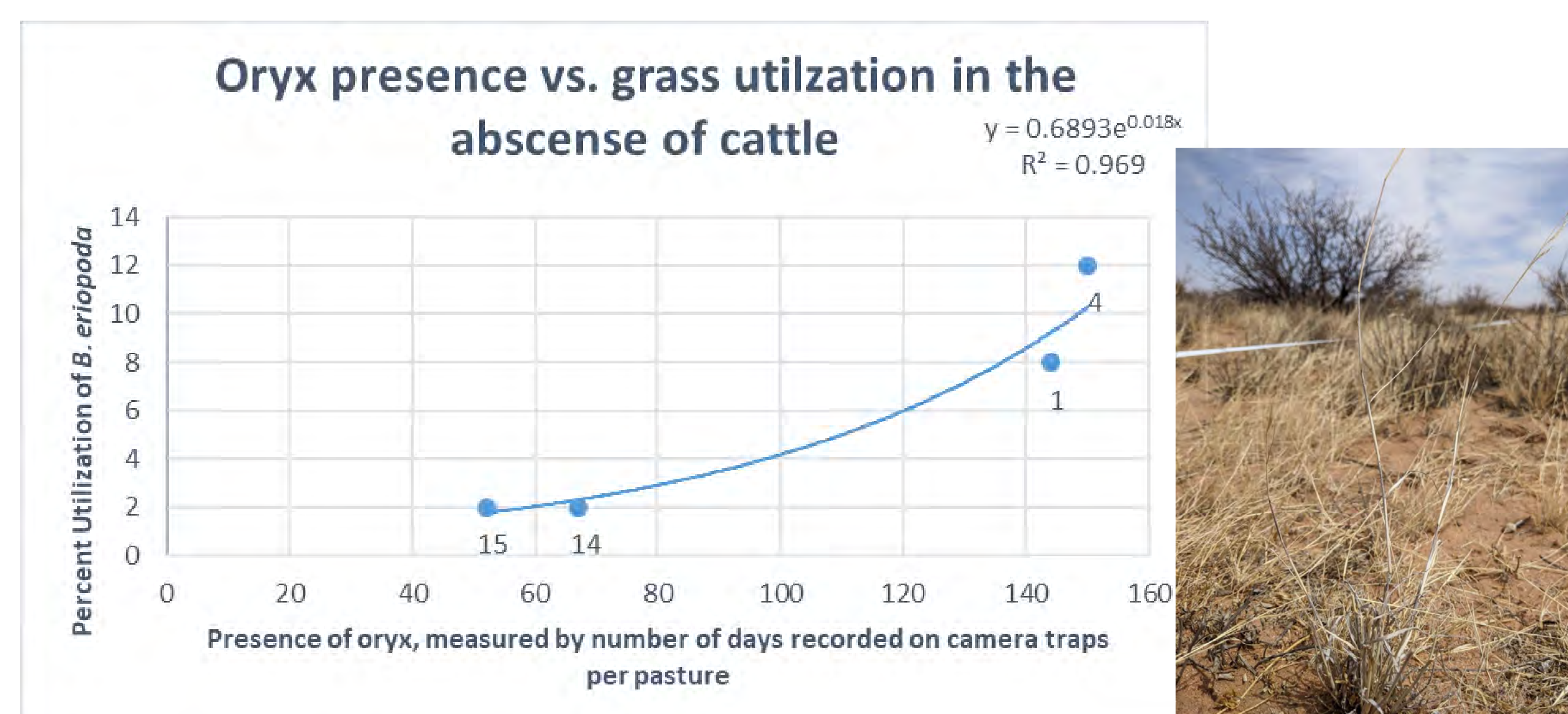


Fig. 3: Positive correlation between oryx presence and percent utilization of *Bouteloua eriopoda*. Points in graph are labeled with corresponding pasture number. Oryx presence is measured as the number of days any number of oryx were recorded by camera traps over an 18 month period. *Bouteloua eriopoda* (specimen grazed by oryx show on right) is a perennial native grass which is critical forage for livestock and wildlife and used as an indicator of cattle grazing intensity. We measured stubble heights and percent utilization of *B. eriopoda* in 2022 while pastures were destocked to determine the amount of forage that is being consumed by exotic oryx.

Results & Discussion

Oryx distribution was heterogenous and presence was greatest in pasture 4 and then pasture 1 (Fig. 2). Oryx average percent utilization of *Sporobolus spp.* and *Bouteloua eriopoda* in the study area appears to be relatively light (1% and 6% respectively). Higher oryx presence in pastures 4 and 1 was correlated with higher percent utilization of *B. eriopoda* of 12% and 8% respectively (Fig. 3). In pasture 4 the targeted percent utilization rate is 30%. Losing almost half of that is a significant portion of forage production which must also be rationed for the cattle breed comparison study.

B. eriopoda grows on open ground in matts, whereas *Sporobolus* often grows up from within *Gutierrezia sarothrae* in bunches which gives it a degree of protection and may be why oryx utilized a lower percentage of it when compared to *B. eriopoda*.

Herds of >20 oryx grazing continuously through the year have been observed on camera traps across the CDRRC. Expected dry matter intake needs of oryx is 6kg/day⁸ which we expected to cause a higher percent utilization of perennial grasses than we observed. The lower utilization could be because the mean size of an oryx home range reported in a Kalahari study is 60,000 ha⁹ (3X the size of the CDRRC), implying the oryx herd at CDRRC also forages at neighboring ranches including Jornada Experimental Range (JER).

Implications

Data on oryx utilization of additional species, especially dicots and *E. desvauxii*, should be collected at more locations. The breed comparison study must account for forage consumed by oryx when setting stocking rates and comparing cattle breed grazing effects in different pastures. Allowing oryx hunts at CDRRC during hunts at JER may alleviate some of the grazing pressure in the study area.

References

1. Bender, L.C., et al., 2019. Population dynamics and control of exotic South African oryx in the Chihuahuan Desert, south-central New Mexico. *Human-Wildlife Interactions*. 13, 158-166.
2. Estell, R.E., 2021. The genesis of the Jornada criollo cattle program. *Journal of Arid Environments*. 193 <https://doi.org/10.1016/j.jaridenv.2021.104563>
3. Taylor, C.R. 1969. The eland and the oryx. *Scientific American*. 220, 88-97.
4. Selebatso, M., Maude, G., & Fynn, R.W.S. 2018. Adaptive foraging of sympatric ungulates in the Central Kalahari Game Reserve, Botswana. *African Journal of Wildlife Resources*, <https://doi.org/10.3957/056.048.023005>.
5. Cain, J.W., Avery, M.M., Caldwell, C.A., Abbot, L.B., & Holechek, J.L. 2017. Diet composition, quality, and overlap of sympatric American pronghorn and gemsbok. *Wildlife Biology*. doi: 10.2981/wlb.00296.
6. Hoenes, B.D., Bender, L.C., 2010. Relative habitat-and browse-use of native desert mule deer and exotic oryx in the greater San Andres Mountains, New Mexico. *Human-Wildlife Interactions* 4, 12-24.
7. Andreoni, K.J., Wagnon, C.J., Bestelmeyer, B.T., Schooley, R.L., 2021. Exotic oryx interact with shrub encroachment in the Chihuahuan Desert. *Journal of Arid Environments*. 184, <https://doi.org/10.1016/j.jaridenv.2020.104302>.
8. Tromp, L.R., 2015. Using remote sensing to explore the role of ambient temperature in determining gemsbok (*Oryx gazella*) usage of a heterogeneous landscape in the central Kalahari. Master's thesis, University of the Witwatersrand, Johannesburg, South Africa.
9. Diekmann, R.C., 1980. The ecology and breeding biology of the gemsbok *Oryx gazella gazella* (Linnaeus, 1758) in the Hester Malan Nature Reserve. Master's Thesis, University of Pretoria.

Acknowledgments

We thank Kirsten Romig, Lara Macon, Heather Abeita, Maureen Puffer, Tiana Nez, and Caleb Doss for assistance with collecting data. This research was funded by the USDA NIFA Grant #2019-69012-29853, and LTAR Network. Game cameras, batteries, and support were provided by Louis Bender.