



MORONGO BASIN ALTERNATIVE FUTURES

Mule Deer *Odocoileus hemionus*

About the Species:

The species is common in California, although restricted to areas with habitat containing cover. In California mule deer are classified as a big game animal. Mule deer serve as primary prey to large carnivores, where present. Deer tend to avoid areas of human activity, and prefer to move through ridgetop and riparian areas as travel corridors. Deer travel between winter and summer ranges up to approximately 20 miles, and also migrate by elevation in response to weather.



Threats:

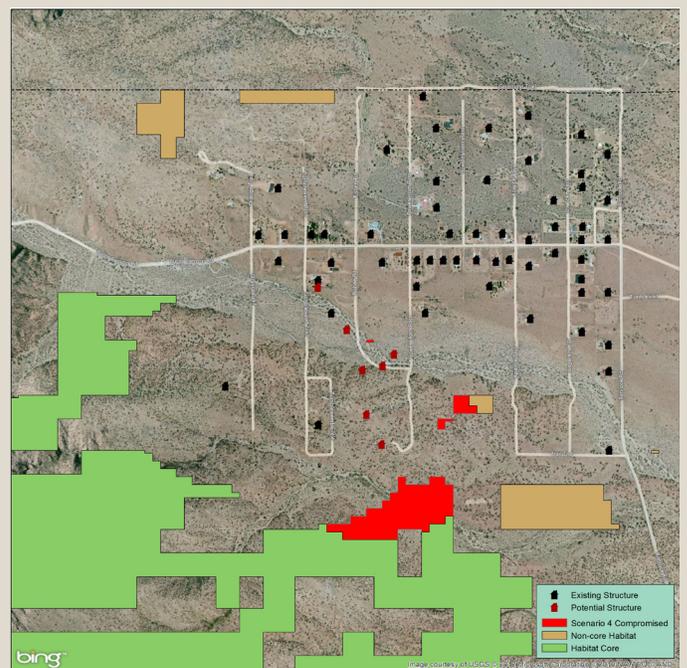
In addition to threats from hunting and predator species, mule deer are vulnerable to impacts from a variety of human activities, including fragmentation by roads, urban expansion, habitat degradation and the presence of incompatible land uses. Nationally, vehicles kill several hundred thousand deer each year.

Habitat:

Large blocks of undisturbed core habitat for mule deer occur along the western edge of the Morongo Basin study area near the San Bernardino National Forest. A diversity of habitat types that include access to perennial water best describes the needs of the species. Lifecycle and climate changes are reasons for the use of different types of habitat, including the protected areas in Little San Bernardino Mountain pinyon-juniper and the Joshua Tree woodlands in the northern part of Joshua Tree National Park, including the Nolina Peak area.

Potential Development Impacts:

None of the Alternative Futures modeled scenario development patterns would result in significant loss of habitat for the mule deer. However, an impact on core habitat from Scenario 4 development patterns arises from the location of five proposed structures in the vicinity of Burns Canyon Road, which would result in loss or degradation of about 17 acres of habitat core.

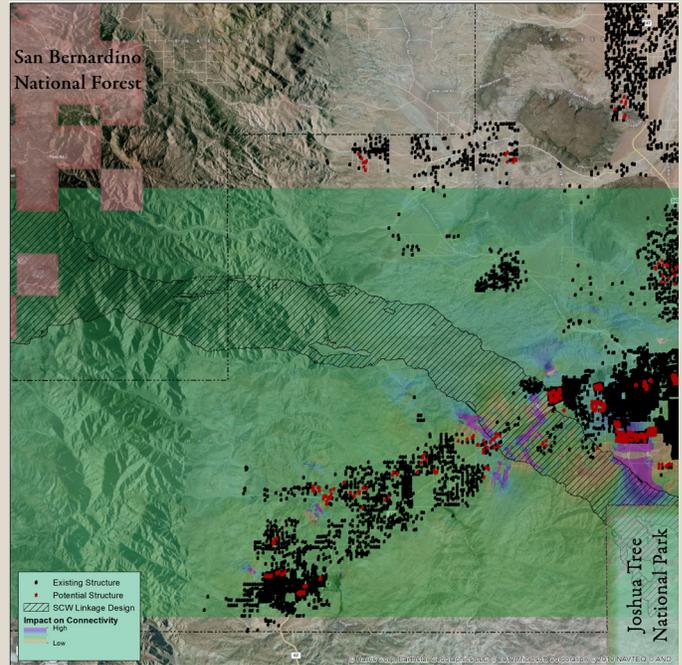


Scenario 4 could result in approximately 17 additional acres of habitat becoming compromised due to additional development south of Burns Canyon Road.

The illustration on the previous page is a good example of the potential use of the Wild Planner tool to work at finer scales to evaluate proposed development and by adjusting the location of a small number of structures, to essentially eliminate development impacts for some species. The use of this type of analysis in combination with a linkage design such as those included here provides planners and land owners with additional tools to help determine the potential impacts of various development and conservation choices.

Strategies for Protection:

Protection strategies for mule deer should be focused on thoughtful choice of development sites as well as modifications to roadways to accommodate mule deer movements; these could include overpasses, bridged undercrossings, guide fencing, and escape ramps. Habitat connectivity for mule deer mapped by Wild Planner is similar to the linkage mapped by SC Wildlands. Some restriction of this linkage by development along the Twentynine Palms Highway suggests that the effective linkage zone could be widened to include the area of high current density south of the highway. Planned development scenarios would increase landscape resistance from 2.5 percent (Scenario 2) to 3.2 percent (Scenario 4), however all of these scenarios have nearly identical patterns of impact that could significantly impede movement of mule deer across the Twentynine Palms Highway (see connectivity impacts with Scenario 4, right). Thus, highway design modifications and crossing structures could mitigate these potential impacts.



Potential Change in Mule Deer Connectivity with Scenario 4.

References:

- Penrod, K., C.R. Cabañero, P. Beier, C. Luke, W. Spencer, and E. Rubin. 2005. South Coast missing linkages project: A linkage design for the San Bernardino-Little San Bernardino connection. *Idyllwild: SC Wildlands*.
- Penrod, K., C.R. Cabañero, P. Beier, C. Luke, W. Spencer, E. Rubin, and C. Paulman. 2008. South Coast missing linkages project: A linkage design for the Joshua Tree-Twentynine Palms connection. *Idyllwild: SC Wildlands*.
- Weigel, S., Ellis C. and B. Brock. 2013. Integrating Scenario Planning Tools with Wildlife Planning Tools: Informing Land Use Planning in a Rural Desert Landscape via the Morongo Basin Alternative Futures Project. Lincoln Institute of Land Policy Working Paper.

Photo Credit: USFWS.

Map Credit: Brent Brock, Craighead Institute.

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