

### **7.3 Southern Mule Deer (*Odocoileus hemionus fuliginatus*) – Category SS**

#### **Management Units with Known Occurrences**

The southern mule deer (*Odocoileus hemionus fuliginatus*) is 1 of 6 subspecies of mule deer found in California. The range of the southern mule deer extends south of Los Angeles County into northern Baja California, Mexico (CDFW 2015). In the MSPA, southern mule deer have been documented in MUs 3, 4, 5, 6, 7, 8, 9, and 10 (see online map: <http://arcg.is/2hpnKu1>). Southern mule deer are adapted to a variety of habitats in western San Diego County, including woodlands, shrublands, meadows, grasslands, and riparian areas. Shrub habitats and woodlands interspersed with meadows or grasslands are important for food resources, as well as cover for shade and protection from predators. Southern mule deer are mobile but nonmigratory. They prefer to move through areas where there is high vegetative cover, such as ridgetops or riparian corridors, and typically avoid areas of sparse vegetative cover, agricultural areas, urban areas, and areas with high levels of human activity. Access to dependable water sources is important for mule deer, especially during the summer. Home ranges for southern mule deer in San Diego County are generally small (average 49 hectares), which is 2 to 20 times smaller than home ranges estimated for other subspecies of mule deer elsewhere in California (Kie et al. 2002).

Mule deer have been documented in the MSPA through various track and camera monitoring efforts, including those by the San Diego Tracking Team, Conservation Biology Institute (CBI 2002, 2003), City of Carlsbad (2015), USGS (Rochester in prep.), and others. Deer movement and connectivity within the MSPA have been assessed using noninvasive genetic sampling of deer scat. This research revealed significant population genetic structure and low levels of movement and gene flow (Mitelberg and Vandergast 2016; Bohonak and Mitelberg, unpublished report).

#### **Management Categorization Rationale**

Southern mule deer should be managed as a Species Management Focus Category SS Species, because their persistence is at lower risk of loss compared to SL and SO species; however, this species still requires species-specific management actions (see Vol. 1, Table 2-4).

Habitat loss and fragmentation by urbanization and roads are the leading threat to southern mule deer and could result in local extirpation without appropriate

conservation measures. Roads are a major barrier to movement as well as a significant source of direct mortality. A study of deer genetics in San Diego County found evidence for limited dispersal, a population structure that corresponds to major freeways, and population bottlenecks within the past 60 years (Bohanek and Mitelberg, unpublished data). Climatic changes, such as drought, play a key role in declines in mule deer populations (Wilson et al. 2005).

Genetic studies of deer identified that major highways are restricting mule deer connectivity (Bohanak and Mitelberg 2014; Mitelberg and Vandergast 2016). Highways, in particular, are isolating mule deer populations in the western part of the MSPA, where populations generally correspond to existing reserves and canyons. Bohanek and Mitelberg (2014) identified two regional populations using genetic clustering techniques: a western and an eastern population, with evidence of a mixed population assignment in the vicinity of SR 67. The area around SR 67 is characterized by a transition from dense suburban development to the west to more rural development with large areas of open space to the east (Mitelberg and Vandergast 2016). The genetic data indicate deer have high family group home range affinity with most female young occupying at least a portion of their mother's home range as adults. Male deer moved farther but did not disperse widely. Genetic structuring of the population is occurring indicating that some linkages may not be functioning for deer. Torrey Pines, Sorrento Valley, Peñasquitos Canyon, Peñasquitos Creek, Carrol Canyon, MCAS Miramar, and Mission Trails may be considered as a separate management unit from those elsewhere in the subspecies range (Bohanek and Mitelberg 2014).

In addition to genetic studies, track and camera studies completed by the City of Carlsbad in 2015 documented the presence of southern mule deer in isolated habitat fragments within the city; it is unclear if connectivity to larger habitat patches east of Carlsbad are being maintained (City of Carlsbad 2015).

### **Management and Monitoring Approach**

The overarching goal for southern mule deer is to enhance and expand areas occupied in San Diego County within suitable natural vegetation surrounded by a limited number of high use roads, and increase connectivity (and reduce potential road mortality) between occupied and suitable habitat areas to allow expansion and movement of southern mule deer occurrences and to ensure persistence in the MSPA over the long term (>100 years).

For the 2017–2021 planning cycle, the management and monitoring approach for southern mule deer will focus on completing a genetic analysis of the species in the northern portion of the MSPA and using the results of these and past regional genetic studies to identify barriers to deer movement, and to identify and implement measures to improve deer connectivity.

Beginning in 2018, genetic studies will be initiated for southern mule deer in MUs 7, 8, 9, and 10 to determine gene flow as well as possible barriers to connectivity. West of Interstate 5, these studies will help identify how deer that have been documented in habitat fragments are moving between fragments as well as to larger conserved areas to the east.

Deer genetic studies will inform the preparation of Linkage Evaluations for mountain lions and other species in MUs 8, 9, and 10. Linkage evaluations will inform the preparation of Linkage Management Plans, which will identify specific locations and recommendations for improving deer connectivity, where feasible. Deer genetic studies, Linkage Evaluations, and Linkage Management Plans will inform the identification and implementation of near-term connectivity enhancements for mule deer in MUs 7, 8, 9, and 10, such as wildlife fencing, culvert maintenance, or wildlife crossing structure improvement.

For details and the most up-to-date goals, objectives, and actions, go to the MSP Portal Southern Mule Deer summary page: [http://portal.sdmmp.com/view\\_species.php?taxaid=898459](http://portal.sdmmp.com/view_species.php?taxaid=898459)

### **Southern Mule Deer References**

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