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Generational Drought and Its Impact on Utah's Mule Deer Population

Analyzing the relation of urbanization of mule deer habitat & drought conditions in Utah - Efforts to alleviate a 30-year decline in mule deer population.

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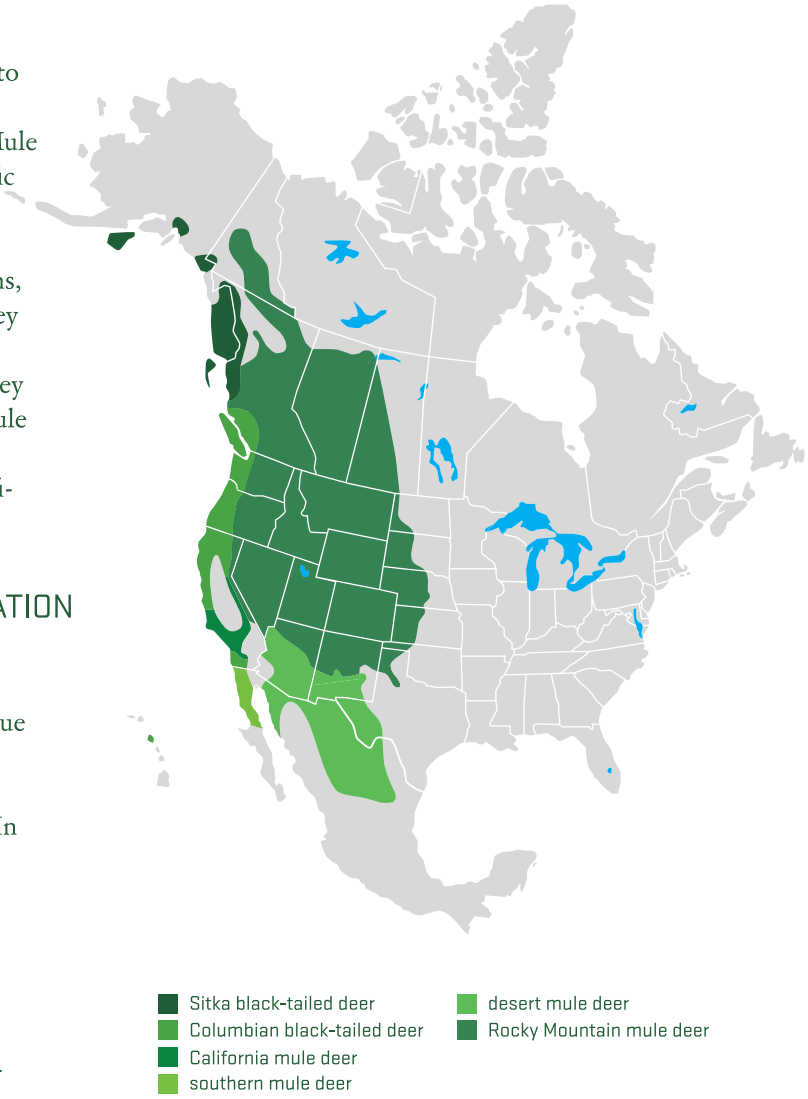
WHAT IS A MULE DEER?

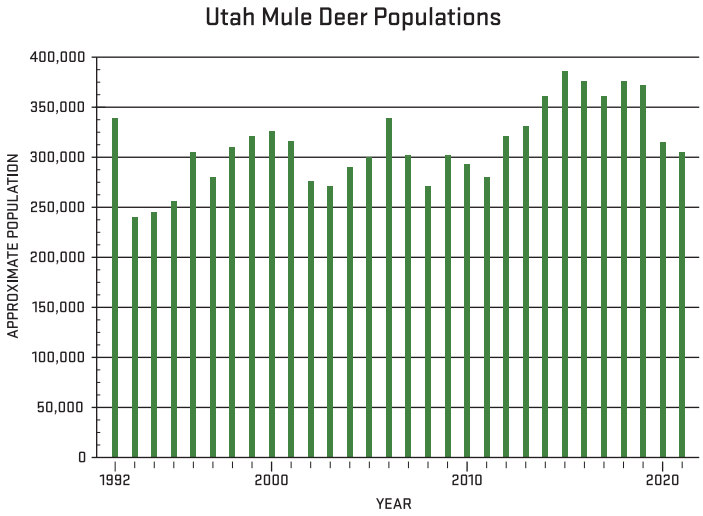
Mule deer (Odocoileus Hemionus) can be seen throughout most of Utah. This species, native to Utah, is also common to the greater Rocky Mountain region, extending as far east as Nebraska and north to Canada. Specific subspecies of the Mule Deer include the Black-tailed deer, which inhabits the Pacific Northwest and Northern California. There are ten other identified subspecies of the mule deer. Distinct from the white-tailed deer native to areas east of the Rocky Mountains, mule deer are commonly larger, weighing up to 300 lbs. They are named "mule deer" for their sizable ears, resembling a mule's ears. Like cattle, mule deer are ruminants; as such, they require a specific plant-based diet.[1] To maintain this diet, mule deer often migrate to higher elevations in the summer and lower elevations in the winter.[2] This migration plays a significant factor in their yearly diets.[3]



MULE DEER POPULATION CONTROL & LEGISLATION

According to the Utah Mule Deer Statewide Management Plan, mule deer are Utah's most important game animal.[4] Due to increased demand to hunt mule deer, entry permits have been limited. Besides providing economic value through hunting, mule deer offer recreational and ecological value.[5] In fiscal year 2022, the Utah Division of Wildlife Resources (DWR) generated $122,600,553 in revenue, making the preservation of mule deer a vital economic interest to the state.[6] Because of this, DWR sought to maintain a healthy population of 400,000 mule deer within the state.

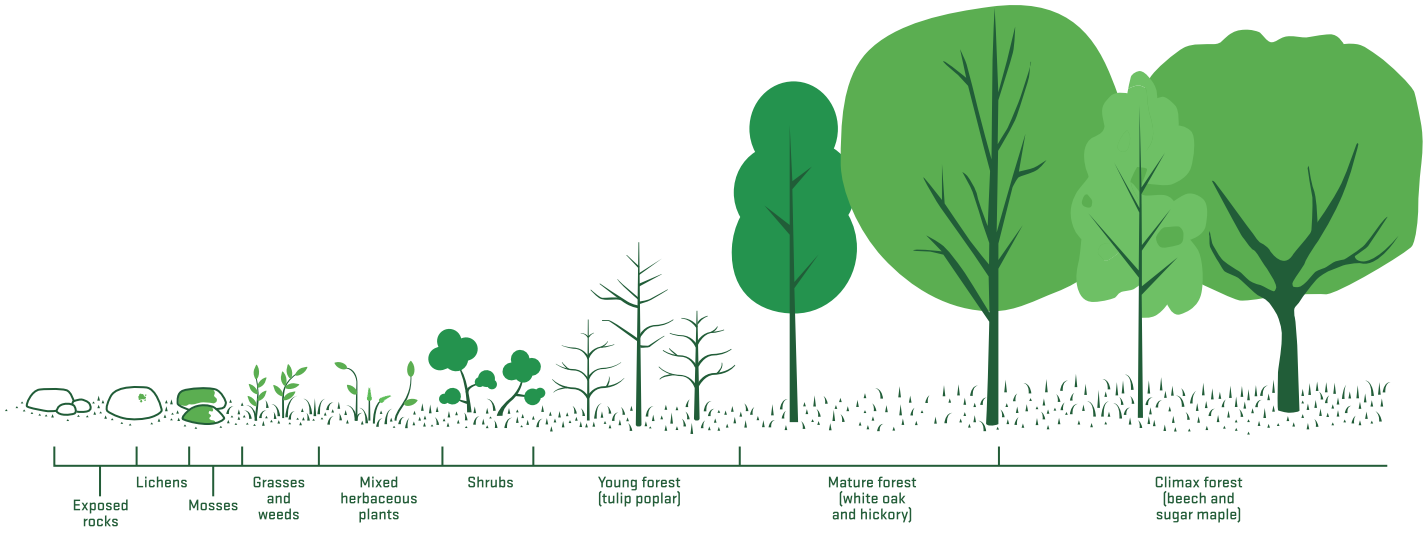
While Utah has not reached its population goal, DWR reports that hunting has not significantly impacted its objective.[7] Utah's most significant threats to mule deer include drought, urbanization fragments, and invasive old-growth plants.[8] Despite the current mule deer population not being optimal in Utah, a combination of state laws and policies have worked together to combat threats to the mule deer population and their habitats.



The Utah Legislature has historically recognized the importance of mule deer within the state and has created several pieces of legislation to protect the species in the past. For example, the Utah legislature passed a bill prohibiting hunting in 1908 due to unrestricted hunting and dwindling wildlife population.[9] In 1995, recognizing the importance of mule deer, the Utah legislature set population objectives for each mule deer species.[10] Finally, in 2012, the Mule Deer Protection Act was created to allow the state to provide additional funding to combat predators threatening the mule deer population.[11]

ENCROACHMENT AND ITS INFLUENCE ON THE MULE DEER POPULATION

Mule deer habitat is affected by various levels of encroachment. Urbanization throughout the Wasatch Front and other areas poses a significant dilemma to critical grazing areas needed to provide for a flourishing deer population. Similarly, encroachment of invasive plants, such as cheatgrass, affects ecological health and increases the likelihood of destructive fires, resulting in lower mule deer survival rates in colder months.[12] According to DWR, Mule deer flourish in areas in the early stages of plant succession, predominantly covered in grass, forbs, and shrubs. Mule deer rely on this environment during the spring and summer to have high fat and protein deposition.[13] The fat reserves of deer may indicate their survival in cold months when food sources are limited.[14] As the Wasatch Front continues to grow, plans should carefully consider the adverse effects of absent vegetation. Additionally, a focused plan should be considered to increase restorative projects in strategic areas where invasive plants have overwhelmed summer feeding areas.



HOW DROUGHT CONDITIONS INFLUENCE THE MULE DEER POPULATION

Water is fundamental to the ecological value of wildlife in the state, particularly the mule deer population. However, according to the Utah Division of Water Resources, 99.8% of Utah is experiencing severe drought.[15] While increased urbanization can fragment the feeding habitats of deer and other species; widespread drought exacerbates unfavorable resource availability through poor foliage. The amount of precipitation in the area directly impacts the health of vegetation consumed by mule deer. Mule deer can have adequate water consumption from their food in favorable conditions but rely on supplemental water sources.

DWR and the Watershed Restoration Initiative (WRI) have expended resources to improve water accessibility for wildlife. Specifically, the WRI focuses on improving three ecosystem values: (1) watershed health and biological diversity; (2) water quality and yield; and (3) opportunities for sustainable uses of natural resources. These values are enforced through a bottom-up method. Project planning and implementation occur locally, operating through one of Utah's five current regional teams. One project DWR and WRI have instituted is installing guzzlers in areas with a high concentration of mule deer but lacking an adequate water source. Guzzlers are water collection devices that typically hold 500-2,000 gallons of water. These devices provide an additional water source to wildlife by catching water and snow melt which then flows into a tank that benefits all wildlife, including mule deer. As of 2017, nearly 900 guzzlers have been installed in Utah, mainly in the state's driest areas.[16]

WRI also plays a significant role in improving Utah waterways to improve ecological health for deer and other species. For example, the WRI participates in watershed maintenance. This enhances water abundance and accessibility for deer populations across Utah. The WRI also oversees the removal of invasive, non-edible, and water-hogging plant species. This leaves room for native plants and grass that sustain deer populations. In 2022, 119 miles of streams have been improved by WRI, including spreading 666,756 lbs. of seed across nearly 165,000 acres in Utah.[17]

CONCLUSION

Because of the benefits of keeping a thriving deer population in Utah, we encourage the ongoing efforts of state and private entities to preserve and restore land resources in the state. Relevant stakeholders should carefully consider preserving the mule deer population as a primary goal when planning future urban development projects. Furthermore, state lawmakers should continue to support land restoration projects. While this report focuses on the impact of urban sprawl and drought conditions, future studies should examine the influence of wildfires, disease, migration patterns, and predators on the mule deer population.

ENDNOTES

1 "Be aware mule deer," Wild Aware Utah, https://www.wildawareutah.org/wildlife/mule-deer/

2 "Be aware > mule deer," Wild Aware Utah, https://www.wildawareutah.org/wildlife/mule-deer/

3 "Be aware > mule deer," Wild Aware Utah, https://www.wildawareutah.org/wildlife/mule-deer/

4 "Utah Deer State Management Plan," Utah Division of Wildlife Resources, 2019, https://wildlife.utah.gov/pdf/bg/mule_deer_plan.pdf

5 "Mule Deer (odocoileus hemionus)," California Department of Fish and Wildlife, https://wildlife.ca.gov/Regions/6/Deer/Natural-History

6 "Fiscal Year 2022 Financial Information," Utah Division of Wildlife Resources https://wildlife.utah.gov/dwr-financial-overview.html

7 "Utah Deer State Management Plan," Utah Division of Wildlife Resources, 2019, https://wildlife.utah.gov/pdf/bg/mule_deer_plan.pdf

8 "Learn about Threats to Mule Deer Heards," Utah Division of Wildlife Resources, https://wildlife.utah.gov/md-threats.html

9 "H.B. 102," Utah State Legislature, March 14, 1907, https://images.archives.utah.gov/digital/collection/432n/id/8687/rec/21

10 "Utah Deer State Management Plan," Utah Division of Wildlife Resources, 2019, https://wildlife.utah.gov/pdf/bg/mule_deer_plan.pdf

11 "S.B. 245 - Mule Deer Protection Act," Utah State Legislature, May 8, 2012, https://le.utah.gov/~2012/bills/static/SB0245.html

12 "Utah Deer State Management Plan," Utah Division of Wildlife Resources, 2019, https://wildlife.utah.gov/pdf/bg/mule_deer_plan.pdf

13 "Regional and Seasonal Patterns of Nutritional Condition and Reproduction in Elk," Cook, R.

C., J. G. Cook, D. J. Vales, B. K. Johnson, S. M. McCorquodale, L. A. Shipley, R. A. Riggs, L.

L. Irwin, S. L. Murphie, B. L. Murphie, K. A. Schoenecker, F. Geyer, P. B. Hall, R. D. Spencer,

D. A. Immell, D. H. Jackson, B. L. Tiller, P. J. Miller, and L. Schmitz., Wildlife Monographs,

2013. https://wildlife.onlinelibrary.wiley.com/doi/full/10.1002/wmon.1008

14 "Utah Deer State Management Plan," Utah Division of Wildlife Resources, 2019, https://wildlife.utah.gov/pdf/bg/mule_deer_plan.pdf

15 Vivian Chow, "Where does Utah's drought stand?" ABC4 Utah, June 11, 2022, https://www.abc4.com/weather/drought/dried-up-where-does-utahs-drought-stand

16 "Water for Wildlife," Utah Division of Wildlife Resources, https://wildlife.utah.gov/news/wildlife-blog/653-water-for-wildlife.html

17 Kevin Cody, "Utah Watershed Restoration Initiative Brings Improvements to over 164k Acres," TownLift, December 1, 2022 https://townlift.com/2022/12/utah-watershed-restoration-initative-brings-improvements-to-over-164k-acres/

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