Researchers discover how vegetation thinning affects New Mexico mule deer population

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Grant Sorensen works to outfit a mule deer with a transmitter to track its foraging habits. Credit: Texas Tech University

The study by Texas Tech scholars found deer prefer newly cleared areas in summer months and older areas during the winter.

In an ecosystem, everything is connected. Large or small, animal or plant, no matter the size, it is impossible to change one thing without affecting something else.

The size and scope of the effect is dependent on what exactly is changed, and how. Small changes usually beget smaller effects; large changes have a more wide-ranging reaction from the rest of the ecosystem.

The ecosystem in north central New Mexico is as diverse as any in the region, with numerous types of vegetation available for the multiple species of animals that inhabit the area. But it is the action of reducing two certain types of vegetation and its effect on one certain animal that piqued the curiosity of several researchers in the Texas Tech University Department of Natural Resources Management (NRM).

Grant Sorensen, who is currently in medical school at Texas Tech University Health Sciences Center but earned his master's degree and doctoral degree in NRM, led a group of researchers in a study that examined habitat selection of mule deer around Raton, New Mexico, following vegetation-thinning treatments that took out pinyon pine and juniper trees. The idea behind the thinning was to improve forage conditions.

Through monitoring adult mule deer does after capturing and fitting them with tracking collars, Sorensen, along with NRM professors Phillip Gipson and Mark Wallace, NRM associate professor Robert Cox and New Mexico State University associate professor James Cain, were able to determine which of the treated areas does preferred over several years.

"We found that mule deer were actually able to select or use these treated areas, but it was at a certain time frame," Sorensen said. "As the treatment started to age, we saw that their use of these treated areas

declined. We know they constantly preferred to be closer to water sources and those sorts of things. In the study area there's a lot of development, a lot of action and a lot of people around, and the deer tended to be a little bit closer to developed areas. That can be explained a couple of ways, maybe some protection from predators or these developed areas are constantly being manipulated. So that kind of goes back to them preferring the earlier treated areas."

The project, which dates all the way back to 2011, took almost a decade to publish due to the need to experience several weather seasons and conditions, such as drought. Its results could help future ecologists and natural resource managers develop better treatment plans that can enhance the ecosystem while not drastically changing things.

"One of the most important things is that this is not necessarily a totally new thing," Gipson said. "But it's confirmation. It says, "Hey, here's really what we've shown, and it fits into the speculation and helps to clarify scientifically what's really happening.'"

Clearing the forest

A mule deer doe with her fawn. Credit: Texas Tech University

Initially, overgrazing by cattle and long-term climate trends brought the first concerns about the longevity of forage vegetation in the area where the study was conducted. The NRA Whittington Center, located just off U.S. 64 south of Raton, is a hunting, shooting and outdoor recreation facility founded in 1973 that provides guided and unguided hunts, RV and tent camping along with wildlife adventures.

While grazing and weather factors reduced the amount of forage vegetation, which was struggling to grow with the demands, they weren't the only factors. Over the last 80 years, since virgin timber was prevented from being taken out of the area, the trees in the area have

grown dramatically, further reducing the amount of forage vegetation available to not only ranchers but wild animals, like mule deer.

In particular, two types of trees were of greatest concern—the pinyon pine and juniper breeds.

"Pinyon pine doesn't provide a marketable timber and it doesn't provide other resources that are usable. Juniper berries and things like that are out there but don't have a commercial market in that sense," Wallace said. "Then, it shades out a lot of potential for forage vegetation. Mule deer are a small ruminant, which means they can't live like cattle do on grazing, eating a lot of low-quality grass and ruminating on that for a long time. They need fairly high-quality stuff. So, they're eating selected digestible parts of grasses, shrubs, forbes, all of the above."

In order to increase access to forage vegetation for the mule deer, a plan was made to thin some of the pinyon pine and juniper using prescribed fire. However, given the drought conditions of the area, there was an aversion to doing so.

So, a device called a hydro ax was brought in that resembles a front-end loader, but with a giant, mulching saw on the end that can eliminate a tree with up to an eight-inch diameter trunk. Then a rotary mulcher came in to eliminate the medium to small-sized shrubs. It also can pick and choose how much and which kinds of vegetation to eliminate.

"You don't want to stand in front of one of those throwing out six-inch chunks of wood," Cox said. "By doing this, they can go across the landscape and selectively thin out those small ones. They can cover a lot of ground like that."

The waiting game

Mule Deer outfitted with tracking devices. Credit: Texas Tech University

With the forest cleared, roughly 30-40 mule deer does were captured and outfitted with very high frequency (VHF) telemetry collars. The only drawback was that researchers had to physically go out to track the deer each day and determine their movement patterns. Later, more deer were outfitted with collars using GPS tracking technology as they became more affordable and available. These collars provided live, real-time updates by sending satellite tracking locations via email.

The GPS collars also allowed for data collection at night, and they would give off a mortality signal if the collar had failed to move within a

certain amount of time, whether the mule deer had been killed, migrated from the area or something had happened to the collar.

Not only did the project take several years just to gather data and track the deer for as long as possible, researchers also had to wait out the weather in order to gather data from different climatological factors such as drought, rain and harsh temperatures.

Most importantly, the vegetation in the areas that had been cleared needed a chance to grow back in order to determine which areas the mule deer preferred.

"Some of these changes take a long time to see any effect," Sorensen said. "In the summer months, the oak, the herbaceous material, all that's growing more readily because of monsoon-driven rains out there. Big rains come through and you have the pop up of the forbes and everything. But as the winter sets in, everything kind of settles down and becomes dormant, so it becomes more homogenous across the landscape."

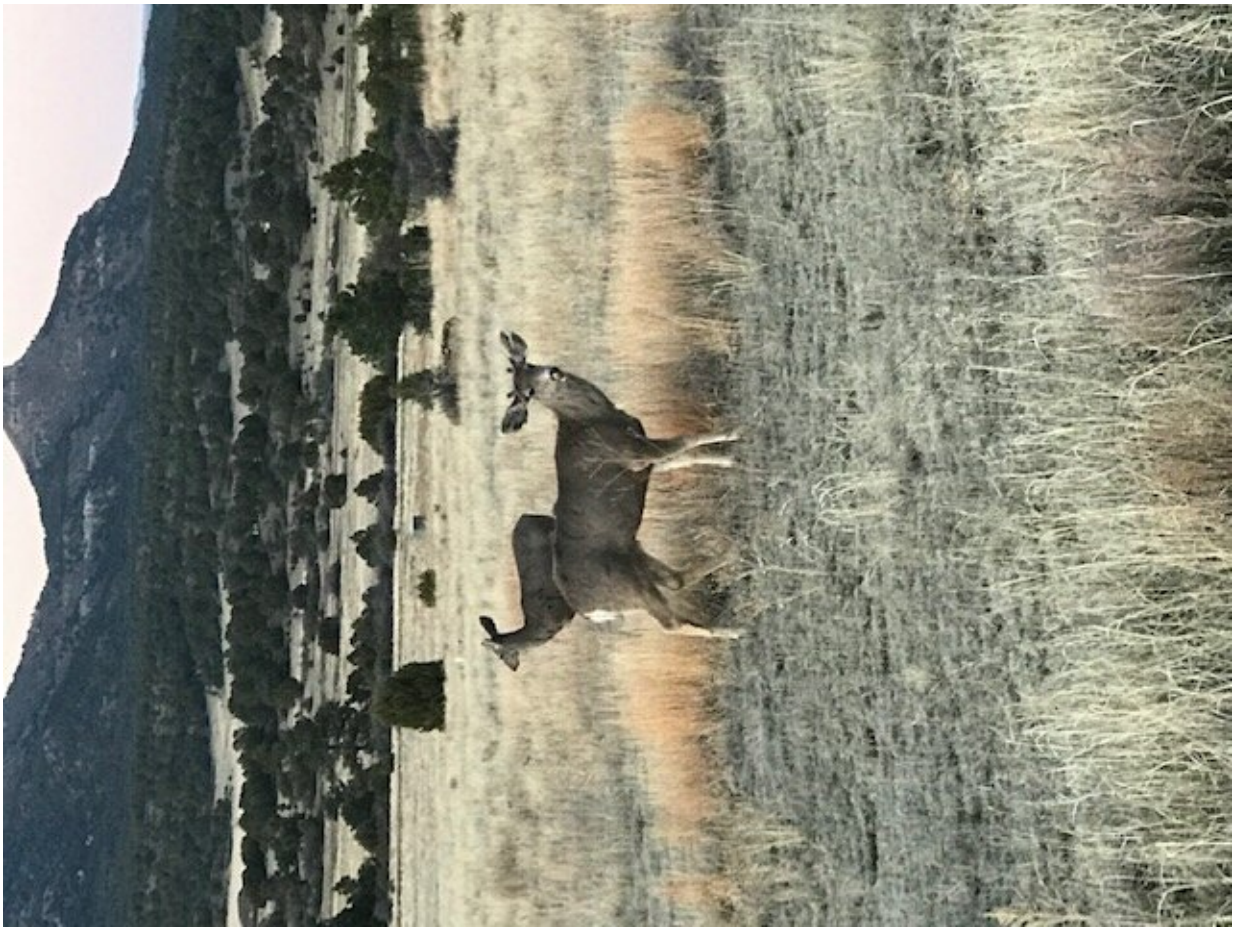
Results also showed that the season played a part in where the mule deer chose to graze, selecting the more recently treated areas during the summer and areas that had been thinned four or more years prior in the winter. That may have had more to do with protection than foraging.

"These deer are not really migratory," Sorensen said. "They kind of just stay there, and a lot of times the older areas were those denser areas, and if the wintertime is particularly brutal, those older areas might offer just a little bit more protection from the elements."

Other threats

As with every ecosystem, animals that can be considered a predator also

can be viewed as prey.



Mule deer on the Whittington Center near Raton, New Mexico.

While the mule deer forage over the area, they also are being watched by the predators that inhabit the same areas—coyotes, bears, bobcats and mountain lions being most prevalent. It is not entirely known in this study how much predation—the preying of one animal on others—affected which areas mule deer chose before and after thinning of vegetation.

"Bears turned out to be the primary predator during the drought, killing the young fawns," Gipson said. "That's your reproduction, and it just knocked down the deer population tremendously. But as soon as the moist weather started coming back in the third year, and I guess the fourth year, the bears basically stopped killing the fawns and switched to eating the berries, acorns and all the other roots and vegetables."

Predation could be a key factor for several reasons, and not just because the deer were the prey. Deer could have chosen the forage areas closer to human population and development because the predators avoided those areas, as this study happened on a hunting/shooting range. Also, while hunting does occur at the Whittington Center, no does were hunted, only bucks.

"The question is, and we don't have the answer at all, was this because of food source availability?" added Wallace. "Or was it cover-involved, meaning were the deer fawns harder to find because vegetation had grown up? If there were food sources in other places so the bears weren't sitting on top of that site the whole time, then they're not there to find the fawns."

This, likely, will be the next step in this study, determining the effects of predation on mule deer population, including humans and hunting. Gipson said the Whittington Center remains open to further studies conducted by Texas Tech researchers, and they are excited about the possibility of continuing that research.

"I think continuation of predator studies is needed, and we need to probably take into account that the big cash return from deer out there is the trophy products and trophy bull elk," Gipson said. "One of the big mysteries is how the cougar population impacts those creatures, and I guess bears and coyotes could take them, too.

"I know this group would have the makings of a good team to start a new round of research, but we'll have to wait and see what the new executive director of the Whittington Center thinks about it. But we'd like to have some tentative proposals or at least a brief explaining what might be done ready to hand them."

Dave Kelner, the new executive director of the Whittington Center, is eager to continue working with researchers on new areas of discovery in the region.

"As the new executive director, on the Whittington Center's behalf, we look forward to continuing this valuable partnership and discussing future research proposals," Kelner said.

Provided by Texas Tech University

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