Jackson Hole News&Guide

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Moose declines puzzling

Habitat, malnutrition, predators play roles.

By Cory Hatch, Jackson Hole, Wyo.
Date: May 12, 2010

Researchers and wildlife managers trying to suss out the cause of moose declines in the Jackson Hole area say there's no simple explanation for the species' diminishing numbers in the past two decades.

Further, moose experts disagree about the degree to which predators could be responsible for the population drop.

What they do know is that the population is currently about 930 animals, or about 26 percent of the 3,600 population objective set by the Wyoming Game and Fish Department. Hunting opportunities in the region have shrunk to 25 licenses, or roughly 5 percent of 480 moose licenses offered in 1990.

"Moose, of course, are hard to study," said Joel Berger, a professor of wildlife conservation for the University of Montana.

The species' solitary nature and ability to inhabit remote locations, he said, make gathering data difficult.

"Without knowing something about individual survival rates and reproduction, it's hard to get a handle on what's going on," he said.

Berger, who studied moose north of Jackson from 1995 to 2005, said initial perceptions were that bears were having an impact on the population. Wolves, he said, didn't get to Jackson Hole until late 1997.

In his study, Berger used radio collars to track about 20 female moose per year. He also looked at scat samples to evaluate whether the female moose were pregnant.

"We would then monitor females who were pregnant to determine if they gave birth and, if they did, how long their calves survived," he said in a telephone interview from his office in Missoula, Mont. "The final thing we were doing was evaluating the causes of mortality on adult females."

Berger compared his results to a study in the late 1960s that showed twinning rates, the rate at which cows produce twins, of about 10 percent and pregnancy rates of about 90 percent. What he found was that twinning rates dropped to less than 5 percent and pregnancy rates declined to 75 percent.

"This suggested that it wasn't predation but that it had to have some basis in nutrition," he said.

Further, while wolves heavily impacted calf survival during one particular year, overall calf survival tended to be relatively high.

As for mortality of adult female moose, malnutrition accounted for 60 percent of known deaths, while predation, roads and human hunting accounted for 10 percent each. The final 10 percent of mortalities were caused by unknown factors. Those trends, Berger said, stayed relatively constant throughout the study.

Berger's best guess is that 50 years ago, as moose populations came into the ecosystem, willows were far more abundant than they are now and the moose populations increased. However, he said, moose began to deplete those willows, and the population subsequently dropped.

"Moose densities were basically shaping the system," he said.

Scott Becker, a former University of Wyoming graduate student who is now a bear and wolf management specialist for the Wyoming Game and Fish Department, studied moose in the region from 2005 to 2008 to determine the leading cause of the population declines in the northern part of the Jackson Herd.

Becker and his colleagues put GPS collars on 20 adult female moose and used radio collars to track the movements of roughly 40 more adult females and 27 adult males.

While adult males had good survival rates, female survival was variable, often depending on the severity of the winter.

"We had a relatively harsh winter in 2008, and that's when most adult females died ... in late winter, which suggests that the adult female's condition wasn't adequate to survive," Becker said. "It would make them more prone to predation, whether from bears or wolves, because they wouldn't be able to get away as easily."

In addition to looking at survival rates, Becker measured the condition of animals during trapping and collaring, which took place from mid-February to late March.

"It appeared that moose were deficient in four different nutrients based on the hair and blood analysis – copper, manganese, phosphorus and zinc," he said.

Wildlife researchers don't have a good idea of what normal levels of those nutrients are in moose, he said, but "they all play important roles in reproduction."

As for measures of reproductive success, pregnancy rates were relatively high, while parturition rates – pregnant cows observed with calves the following spring – were slightly below average. For the first eight weeks of life, calf survival was 63 percent, relatively high, while annual calf survival was 46 percent, also somewhat high.

"There's no question that some calves that hit the ground are being lost due to bear predation, but at this time it's not a big problem," Becker said. "It is more similar to populations that are more limited by habitat rather than heavy predation."

In Becker's study, twinning rates were only about 6 percent.

"Twinning rates were very low, which suggests there is something about the habitat that is likely limiting the nutritional condition of these moose that is preventing them from twinning in high numbers," he said.

Further, he said, cow moose were experiencing "reproductive pauses," years where they didn't produce calves following years during which they gave birth.

"The biggest problem with the moose during my study wasn't really calf survival," Becker said. "It's trying to get these cows to drop more calves. We need more babies to start with."

Like Berger, Becker has some guesses about what habitat problems could be limiting the moose population. One is that the 1988 fires or perhaps mountain pine beetles have limited conifer cover, which the moose depend on in the summer to keep cool. If moose have to spend more time seeking shade, that could mean they spend less time eating, he said.

Now, more predators in the area could be accounting for more moose mortality.

"We didn't have that many wolves running around Buffalo Valley or down in Pacific Creek," Becker said. "In recent years, the dynamics of wolves in that area has changed."

"Everybody wants that black or white answer, and there's very few cases when you can provide that," he said.

Doug Brimeyer, Wyoming Game and Fish north Jackson wildlife biologist, agreed that habitat likely has some role to play in the decline of the moose population but cautioned against discounting the effect of predators.

"Your habitat can cause some reproductive declines in the population, but when the moose population is at a lower level, the predator numbers can suppress the population growth," he said. "Predator levels are not declining at all, so they'll start showing impacts on the overall population. ... the potential for population growth.

"Nobody over here is denying that there's some habitat variables that are playing a role in the productivity of this population in terms of survival and recruitment, but the predation side is something that can't be ignored either," Brimeyer said. Wolves and bears are "part of the puzzle, and we're starting to see some changes. There's some habitat issues as well. Our only option as managers is to restrict hunting."

B.J. Hill, a local outfitter, said he thinks the claims about habitat loss are exaggerated.

"I've watched moose literally live off of pine needles," he said. "We live in those mountains on a daily basis, and we watch those tracks. We watch those ungulates decline."

Hill said he doesn't think the wolf is entirely to blame. He says grizzly bears probably have a larger impact on moose, especially in the spring.

"You've got grizzly bears in every pocket of country up there," he said. "Those moose can take a hell of a winter, but not with predator alley beating on them constantly."

"I think all the ungulates were holding their own with the grizzly," Hill said. "Now we've added the second predator. It seems to have outrun our moose population. We've taken the best moose hunting [in the country], and now it's ended up being the worst."

Chris Colligan, Wyoming wildlife advocate for the Greater Yellowstone Coalition, said it's premature to blame wolves for the decline in the moose population.

"Certainly [predators have] an additive mortality with moose populations," he said. "However ... is there something else that's occurring that may make moose more susceptible to predation? Most of the data show that moose make up a very small component of the wolf population's diet. In Yellowstone, from 1995 to 2000, of the 576 [wolf] kills, less than 1 percent of those were moose."