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Northland moose researchers see harsh realities of food chain

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By: **John Myers**, Duluth News Tribune

Back in January, wildlife researcher Glenn DelGiudice promised Minnesotans they would see results very quickly from his planned study of moose calves in the state's northern forests.

Unfortunately for the moose, he was right.

Within days of finishing a Minnesota Department of Natural Resources effort to capture 49 moose calves and fit them with GPS transmitter collars, 22 of the newborns already have died, most killed by black bears and wolves.

While it was expected — calves, like fawn deer, are most vulnerable in their first few days and weeks — the high level of mortality is a reminder, even for veteran researchers, of the harsh realities of the north woods food chain.

"Especially in the last few days, bear and to some extent wolves have just been hammering the calves,"

DelGiudice, the DNR's lead moose researcher, told the News Tribune. "We knew that we would lose a lot of calves quickly. But to see it happening in real time like this is all new for us."

Studies worldwide have found that just over half of all moose calves will probably die in their first year, from predators, disease or other causes. Calves provide an easily accessible source of food just when black bears wake up hungry after hibernation and when little else in the woods is ready to eat, such as berries, insects or nuts.

This year's late snow, cool spring and delayed green-up in the forest might have pushed more bears to find calf moose.

DelGiudice is quick to caution not to read too much into the calf mortality so far. It's what happens after this summer and into next winter, as the remaining calves survive their first year, that will be most telling in the effort to learn why Minnesota's moose population is crashing.

"You could have 100 percent of the calves survive and that wouldn't solve our problem," DelGiudice said. "Our problem (in Northeastern Minnesota) is that too many adults are dying; not enough are surviving to reproduce to sustain the population."

As was hoped, the GPS collars are allowing researchers to move in fast when calves stop moving. That fast action has allowed DelGiudice to retrieve 15 of the first 22 dead calves to perform necropsies and find out what problems newborn moose are facing in Minnesota. The other nine were eaten by predators, he said. In some cases, all that remains is "the collar and tracks."

High rate of twins

DelGiudice said the calf study already has revealed new findings not previously known of Minnesota moose calves. For example, a whopping 58 percent of the cows that delivered calves this month had twins. Based on other studies and estimates, researchers had been expecting only a 20 to 30 percent rate of twin births.

"That just blew us away. This may have its roots back in the (mild) winter of 2012, that more cows went into the rut and into this past winter healthy and with higher body weights and could sustain twins," he said.

Researchers also watched this month as some moose cows at first abandoned their calves, sometimes going more than a kilometer away, but then came back to nurse them. It's not clear what triggers that behavior. And they found vegetable matter in the calves' stomachs, indicating that they began browsing in the first few days of life when researchers had assumed they only nursed.

The 49 Minnesota calves were collared during the second and third weeks of May, just hours after they were born, in the first such effort ever in Minnesota using GPS collars that give scientist near real-time data on where the animals are. The calves were found by tracking pregnant cows previously fitted with GPS collars and transmitters.

Of the 22 that had died through Wednesday, DelGiudice said as many as eight may have perished from circumstances surrounding the capture process, but that a final number won't be known until all lab results come in. Those calves also might have had a disease or other problem, such as low birth weight, that would have doomed them whether or not they were collared.

"We're not sure yet what killed some of them. It could have been capture-related, or it could have been they just weren't viable; they couldn't nurse or were sick," DelGiudice said.

One calf was found drowned. Another died from trauma to the skull, possibly from its mother's hoof as the cow tried to defend against predators.

Too few surviving

Ron Moen, a moose researcher at the University of Minnesota Duluth's Natural Resources Research Institute and an adviser on the DNR studies, agreed that it's normal for just over half of moose calves to die in their first year and that a moose population can thrive with just 40 percent of calves surviving. But he said Minnesota moose calf survival has dropped below 30 percent in recent years.

The new calf study should help determine why, Moen said.

"I'd agree that the adult situation is a key component. But I also think that we're losing more calves than is sustainable. We used to see a ratio of about 100 cows to 40 or 45 calves each winter (during aerial surveys). But in recent years that's been more like 20 or 30 calves, and that's not sustainable," Moen said. "If you have more twins and more twins were surviving into adulthood, that would obviously help the population."

While some people have been critical of the DNR capture and collaring effort because it inadvertently causes the deaths of some animals, DelGiudice said the information gained will be critical in determining what, if anything, can be done to save moose in Minnesota.

"I understand why people see that some die during capture and think, 'Why are they doing this?'" he said. "We care about each animal, too. But as scientists we have to look at this from a population standpoint. That's what matters. ... We've already learned things no one knew before."

Parallel adult study

DelGiudice's \$424,000 study is part of a two-pronged effort underway to find out why Northeastern Minnesota's moose herd is plummeting.

Another \$1.2 million effort headed by Erika Butler, DNR wildlife veterinarian, captured 111 moose in January, with 107 surviving. Four died from "capture-related" mortality, probably some sort of stress.

Since then, 14 of the 107 adult collared moose have perished from various causes, Butler told the News Tribune this week. All but one of those were retrieved for laboratory study. One moose had been mostly eaten by the time the crew arrived. Wolves had been carrying the collar around, making it appear to researchers monitoring the GPS signal that the moose was still alive.

Some adult moose have died from parasitic brainworm, while at least two died from anemia or exposure caused by winter ticks. Those moose had lost more than 90 percent of their hair trying to get rid of the ticks on their body. Scientists believe that warmer winter and spring temperatures and earlier snowmelt in recent decades have allowed more ticks to survive, as well as allowing more deer to thrive in moose range carrying brainworm with them.

In some cases, the GPS collars indicated the moose had stopped moving and crews came to the scene to find a down but still-living moose. Those animals were euthanized and retrieved for necropsy.

"The technology is allowing us to get to those animals before they are consumed. That's the point," Butler said. In addition to DNR crews, U.S. Forest Service and Fond du Lac and Grand Portage band of Ojibwe wildlife crews are helping in the recovery effort.

Researchers hope they can get additional funding to push the studies out to five or seven years total. Still, they concede that even if they find a single or combination of causes killing moose faster than they are reproducing, they may not be able to solve the problem.

In February, the DNR canceled the state's longstanding moose hunt after aerial surveys showed moose numbers had plummeted 35 percent in just one year, with only 2,760 estimated this year, down from 4,230 in 2012. The Northeastern Minnesota population was more than 9,000 before 2006.

The crash in the northeast is mimicking that of northwestern Minnesota, which saw its moose population decline in the 1990s from about 4,000 animals to just a few dozen. Scientists studying the northwestern moose decline concluded that a warmer climate has compounded multiple other problems, such as disease and parasites.

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