Will moose thrive or die because of climate change?

By Shannon Hill, Scientific American on 05.10.16
Word Count **955**

A warmer planet caused by climate change is creating new diseases for moose. Photo: Wikipedia

Lee Kantar lost two moose calves this past weekend. They are just a few among many calves that did not survive their first year in the forests of Maine. Kantar, a moose biologist for the state's Department of Inland Fisheries and Wildlife, has been tracking calves for only a few years but early death is a trend he and others can see across the animal's southern range, which stretches through the northern U.S. and Canada. Scientists speculate that young and adult moose alike are plagued by new diseases and parasites. Brain worm and winter ticks, for example, are both worsening as the climate warms. In Maine at least 50 percent of the calves do not live to see their second year. In northeastern Minnesota that number is as high as 90 percent; in the northwestern part of that state the moose population has disappeared.

The devastating news might be countered by more positive signs farther north, however. New research, published April 13 in PLoS ONE, shows that rising temperatures and shorter winters in Alaska have helped moose conquer vast new stretches of territory. Food for the foraging animals is growing rapidly, ushering them into previously stark tundra. The migration likely is not just happening in Alaska but in Canada and northern Russia. "It's an adaptation that at least gives us hope that moose as a species can be maintained," Kantar says.

It is no secret that moose have been steadily expanding northward over the past century. Native Alaskans remember the exact dates when moose first appeared in each successive village. But the reason for this massive migration was hotly debated. Ken Tape, an ecologist at the University of Alaska Fairbanks, had an inkling that the warming climate might be at play. “What I love about working in the Arctic … is that it's a perfect natural laboratory for studying climate change,” he says. “There's no disturbance. Everything is essentially in equilibrium — in a natural balance.” If researchers see any large-scale change, there are not many factors to explain it, save for climate change. For 15 years Tape has been studying how the climate has altered vegetation in the warming Arctic by increasing the number of alder, willow and birch plants. He postulated that the same phenomenon could cause the northward migration of moose.

In the tundra landscape, moose must forage on shrubs that poke above the snow. Tape speculated that this habitat has been slowly stretching northward, ushering moose in its footsteps. To prove it, Tape and his colleagues used a well-known relationship between shrub height and summer warmth. Higher temperatures — and longer summers — allow the shrubs to grow taller. The team then used existing temperature data that dates back to 1910 along with a climate model going back to 1850 to show that shrub height in the area has indeed doubled since 1850. The experts suggest that the moose migration, primarily along rivers and streams that flow into the Arctic Ocean for hundreds of kilometers, might be one of the most dramatic wildlife shifts linked to climate change. To boot, shrub expansion is a circumarctic phenomenon. Tape suspects that moose might be moving northward across the world.

But can gains from migration offset losses from more disease, given how poorly moose are faring in the south? Kris Hundertmark, a wildlife geneticist at U.A. Fairbanks, hates to partition species into winners and losers on the climate change board game, but he concludes that moose will be among the winning species. So, too, does Seth Moore, director of biology and environment of the Grand Portage Band of Lake Superior Chippewa, a Native American tribe in the remote northeastern corner of Minnesota, even though he has watched his studied moose die year after year.

The study by Tape shows that 1,000-pound animals can respond well to the warming world. “You could look at that in a strange twist as a positive adaptation,” Kantar says. Yet he refrains from saying it is change for the better. Many researchers worry that as boreal species such as moose move northward they are only encroaching on the tundra’s existing inhabitants. “The concern is that the Arctic species are having to deal with a lot of competition from the better-adapted boreal species moving in and sharing that habitat,” Tape says. In a sense, moose have now become an invasive species. It is hard to predict what the overall consequences will be for other wildlife, such as caribou, in the region.

After all, moose are dying at alarming rates in the south because new species, such as white-tailed deer — which carry the diseases like brain worm and winter ticks — are moving north and encroaching on their habitat. “These moose will spend 15 percent of their daily (energy) budget scratching and rubbing, trying to get the ticks off this time of

year," Kantar says, "so there is less feeding. There are internal parasites that block nutrients from them. And then they have internal blood loss and they die. It's a horrific way."

Although deer expand at the cost of moose in the continental U.S., moose will likely expand at the cost of other species in Alaska. Tape especially worries about ptarmigan, a medium-size game bird that once inhabited solely the little bit of shrub life available in the Arctic before the 450-kilogram herbivores moved in. Not only are the moose munching on their food supply, the birds' nutritional loss is also likely to be followed by that of boreal predators such as red fox or lynx. Tape is even concerned about how the vegetation might shift — as moose browse willow but leave alder alone — and how that might affect the wildlife as well. "I don't know how it's all going to shake out," he says.

Quiz

1 According to the article, each of the following has contributed to the northward migration of moose EXCEPT:

(A) Shrubs that moose eat have begun to grow farther north.

(B) Species that usually expand at the cost of moose have moved into the moose's habitat.

(C) Moose in the south are dying from diseases and parasites.

(D) Increased temperatures in the south have killed the plants that moose rely on to survive.

2 Based on information in the last paragraph of the article, why might scientist Ken Tape be concerned about the fact that moose eat willow but not alder?

(A) Native species that eat willow trees may die because of a shortage of food.

(B) Alder trees carry diseases like brain worm and ticks that affect native species.

(C) Willow trees cannot survive the increased temperatures associated with climate change.

(D) Native species that live in alder trees may die because of a lack of space to raise their young.

3 Read the sentence from the article.

> *Kris Hundertmark, a wildlife geneticist at U.A. Fairbanks, hates to partition species into winners and losers on the climate change board game, but he concludes that moose will be among the winning species.*

What does Hundertmark mean by the phrase "winners and losers on the climate change board game"?

(A) Moose in the north are much more likely to survive climate change than moose in the south.

(B) Dying from the effects of internal parasites is worse than dying from a lack of food.

(C) Scientists argued about the cause of moose migration, but only some scientists figured out the correct reason.

(D) Some species will die because of climate change while others will adapt and survive.

4 Read the following paragraph from the article.

> *The study by Tape shows that 1,000-pound animals can respond well to the warming world. "You could look at that in a strange twist as a positive adaptation," Kantar says. Yet he refrains from saying it is change for the better. Many researchers worry that as boreal species such as moose move northward they are only encroaching on the tundra's existing inhabitants. "The concern is that the Arctic species are having to deal with a lot of competition from the better-adapted boreal species moving in and sharing that habitat," Tape says. In a sense, moose have now become an invasive species. It is hard to predict what the overall consequences will be for other wildlife, such as caribou, in the region.*

Which word from the paragraph DOES NOT help convey the idea that the moose may cause problems for the native species that already live on the northern tundra?

(A) adaptation

(B) encroaching

(C) concern

(D) invasive

Answer Key

1 According to the article, each of the following has contributed to the northward migration of moose EXCEPT:

(A) Shrubs that moose eat have begun to grow farther north.

(B) Species that usually expand at the cost of moose have moved into the moose's habitat.

(C) Moose in the south are dying from diseases and parasites.

(D) Increased temperatures in the south have killed the plants that moose rely on to survive.

2 Based on information in the last paragraph of the article, why might scientist Ken Tape be concerned about the fact that moose eat willow but not alder?

(A) Native species that eat willow trees may die because of a shortage of food.

(B) Alder trees carry diseases like brain worm and ticks that affect native species.

(C) Willow trees cannot survive the increased temperatures associated with climate change.

(D) Native species that live in alder trees may die because of a lack of space to raise their young.

3 Read the sentence from the article.

> *Kris Hundertmark, a wildlife geneticist at U.A. Fairbanks, hates to partition species into winners and losers on the climate change board game, but he concludes that moose will be among the winning species.*

What does Hundertmark mean by the phrase "winners and losers on the climate change board game"?

(A) Moose in the north are much more likely to survive climate change than moose in the south.

(B) Dying from the effects of internal parasites is worse than dying from a lack of food.

(C) Scientists argued about the cause of moose migration, but only some scientists figured out the correct reason.

(D) Some species will die because of climate change while others will adapt and survive.

4 Read the following paragraph from the article.

The study by Tape shows that 1,000-pound animals can respond well to the warming world. "You could look at that in a strange twist as a positive adaptation," Kantar says. Yet he refrains from saying it is change for the better. Many researchers worry that as boreal species such as moose move northward they are only encroaching on the tundra's existing inhabitants. "The concern is that the Arctic species are having to deal with a lot of competition from the better-adapted boreal species moving in and sharing that habitat," Tape says. In a sense, moose have now become an invasive species. It is hard to predict what the overall consequences will be for other wildlife, such as caribou, in the region.

Which word from the paragraph DOES NOT help convey the idea that the moose may cause problems for the native species that already live on the northern tundra?

(A) adaptation

(B) encroaching

(C) concern

(D) invasive